

LOYOLA UNIVERSITY CHICAGO

April 25, 2010

Transformative Research: Knowledge in Service of Humanity

2010 UNDERGRADUATE RESEARCH SYMPOSIUM

*Fulfilling Loyola University
Chicago's Commitment to
Research and Scholarship in:*

- *Ethics and Social Justice*
- *Children and Families*
- *Natural and Life Sciences
and Healthcare*



Preparing people to lead extraordinary lives

WELCOME

Welcome to the 2010 Loyola Undergraduate Research Symposium: “Transformative Research: Knowledge in Service of Humanity.”

This year’s symposium features the work of undergraduate students across various academic disciplines who collaborated with faculty mentors, research assistants, and graduate students on thought-provoking research projects. Most of our student presenters received funded fellowships through the Loyola Undergraduate Research Opportunities Program (LUROP). Other student presenters engaged in research projects independently through capstone courses, academic coursework, or group projects.

These Loyola students delved into the research process, developing research questions, collecting and analyzing data, and formulating research implications and conclusions. Led by faculty mentors, these undergraduates have participated in the co-creation of knowledge that contributes to a better understanding of local and global communities. In essence, they have engaged in transformative research that fosters critical and innovative approaches to solving real-world problems. For example, they have engaged in a process of intellectual inquiry aimed at researching ways to end childhood obesity, investigating economic recovery, helping to reduce water pollution, improving education, reducing disease, and understanding diversity issues.

Through many hours spent in the lab reviewing data, or in the community assessing service-delivering mechanisms, these students have developed a richer understanding of research and fully engaged in the transformative education of Loyola University Chicago. These featured undergraduate researchers enrich us with new knowledge that potentially serves the larger community through new perspectives. Through undergraduate research, our students bring to life Loyola’s mission of “working to expand knowledge in the service of humanity through learning, justice, and faith.”

Finally, we are grateful to Reverend President Garanzini and Provost John Pelissero for their continued support of our academic and research initiatives. We would also like to acknowledge Kelly Christopher, Grants Development Specialist and Marian Claffey, Assistant Provost, for generously devoting their time and energy towards coordinating and organizing a range of activities leading to this special event.

Samuel Attoh, Ph.D.
Associate Provost for Research and Centers
Dean, Graduate School

Patrick M. Green, Ed.D.
Director, Experiential Learning

2010 Undergraduate Research Symposium Overview

Opening Remarks

Loyola President Michael J. Garanzini, S.J. 1:00pm

Student Perspectives

Ms. Emily Wilk, Provost Fellow and Research Mentoring Participant

Mr. Owen McKenna, Mulcahy Scholar 1:15pm

Student Poster Sessions 1:30-3pm

Award Presentations 3:30pm

Refreshments will be available throughout the afternoon.

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The Loyola Undergraduate Research Program

Most undergraduate researchers fall under the umbrella of the Loyola Undergraduate Research Program (LUROP), which encompasses a variety of disciplines and experiences. The LUROP fellowships and opportunities are described below; for more information on the program, please visit <http://www.luc.edu/lurop/>. Undergraduates are also welcome to work with individual faculty members on research projects that may fall outside the realm of LUROP.



LUROP Opportunities

Biology Research Fellows Program

The Biology Research Fellows Program funds long-term independent research projects under the direction of a faculty mentor in the Department of Biology. Students work for 2-3 years on their respective projects both during the academic year and in the intervening summers. At least a 10 week time commitment on the project is expected during the summers.

Biology Summer Research Fellowship

The Biology Summer Research Fellowship funds research projects with Department of Biology faculty. A ten week time commitment is required, and specific dates are negotiated with the faculty mentor.

Carbon Scholars Program

The Carbon Scholars Program offers a full two-year, interdisciplinary research opportunity for science and math majors to work closely with faculty mentors. This program is designed for students who plan to pursue research in graduate or professional schools.

Center for Urban Environmental Research and Policy (CUERP) Internship Program

The focus of the CUERP Internship Program is for students to conduct interdisciplinary research on issues related to unsustainable natural resource uses in the greater Chicago land region. The Center encourages research projects to combine elements of ecosystem structure and function, impacts on human health, public policy, behaviors, and other environmental factors.

Center for Urban Research and Learning (CURL) Fellowship

The CURL Fellowship is intended to facilitate involvement of students in collaborative research projects with community-based organizations, social service agencies, health care providers, businesses, and government in Chicago's city and suburbs. Through their research and learning projects, fellows are active participants in the university's efforts to improve the quality of life of all members of the Chicago metropolitan community. Involvement in the work of CURL can help students develop a foundation for future graduate programs, community development, or volunteer service.

Mulcahy Scholars Program

The Mulcahy Scholars Program is designed for College of Arts and Sciences majors in the sciences, who are interested in working on an individual project with a faculty mentor, serving as a research assistant, or engaging as a member of a collaborative research team to support ongoing faculty projects throughout the academic year.

Provost Fellowship

The Provost Fellowship is designed for undergraduate students in any academic discipline who are interested in either establishing an individual project with faculty mentorship or working with a faculty member on their ongoing research as a research assistant.

Research Mentoring Program (RMP)

RMP is designed to partner graduate students who are working on their dissertation research with undergraduates who are interested in participating in research. This summer program is designed to support doctoral students in their dissertation research while providing an opportunity for undergraduates to learn more about graduate studies and graduate-level research.

Ricci Scholars Program

The Ricci Scholars Program is an innovative research and cultural immersion program organized around the theme of the meeting of East and West. The program awards selected students with scholarships for travel, research and exploration during a junior year of study divided between two of the world's most important cities: Rome, Italy, and Beijing, China.

Rudis Fellowship

The Rudis Fellowship provides scholarships to students whose research focuses on the comparative study of constitutions. Recipients of the scholarship will write a 20-25 page research paper during the academic year under the guidance of a faculty member in the Department of History or the Department of Political Science.

Women in Science Enabling Research (WISER)

WISER is designed for undergraduate women seeking to explore research science, work closely with faculty, learn how laboratory work is conducted, and build a sense of community.

Presenter Abstracts

This year, the poster presentations have been organized into the research categories that are emphasized in Loyola University Chicago's 5-year strategic plan. In continued efforts to best fulfill Loyola's commitment to social justice and service to humanity, the research and scholarship highlights students' work in Ethics and Social Justice, Children and Families, and the Natural and Life Sciences and Healthcare.

Ethics and Social Justice

Noorah Abdullah

Investigating Recycling Behaviors and Attitudes of Freshmen Students
Anthropology (2011)
Provost Fellowship
Faculty Mentor: Dr. Daniel Amick, Anthropology

The first component of the project is to investigate the waste patterns of freshmen students, and to assess their attitudes and knowledge of recycling. The second component involves the conceptual idea of "choice architecture." To illustrate, decisions are made within a certain set of circumstances and default options; having easy access to recycling bin assists in the decision to recycle and its presence describes the choice architecture. Therefore the second part of the project is to redesign several waste stations in Mertz Hall. Lastly, the third part of the project is to educate through the screening of the documentary film titled *Trashed*. Overall, the project seeks to understand the relationship between human behavior and the practice of recycling and the moral, structural and environmental implications of it.

Geoffrey Adamson

Tchaikovsky as Nationalist: Romantic Nationalism in the Festival Overture: The Year 1812.
History and Philosophy (2011)
Provost Fellowship
Faculty Mentor: Dr. Marek Suszko, History

This paper will explore the Romantic nationalist themes present in Festival Overture: The Year 1812. It will show how Tchaikovsky dynamically adapted the "Official Nationalist" ideology of Autocracy, Orthodoxy, and Nationality into this piece. Also, it will show how these three themes reveal themselves in the life and work of Tchaikovsky. This consistent usage and interest in Autocracy, Orthodoxy, and Nationality shows Tchaikovsky's commitment to these ideals. Additionally, this paper will show how 1812 Overture is a general representation of the Romantic struggle against the principles of Western Enlightenment. Moreover, this paper will argue that Tchaikovsky's piece find new value in the eyes of academics and musicians because of this unique embodiment of a Romantic struggle.

Rodrigo Aguayo

How Perceived Discrimination Influences Perceived Regard in LGBT Friendships
Psychology (2010)
Provost Fellowship
Faculty Mentor: Dr. Tracy DeHart, Psychology

Whereas past researchers have mainly focused on the correlation between discrimination and relation-

ship functioning, the current study investigates the causal relation between perceived discrimination and LGBT individuals' evaluation of their relationships with their best friend. It is proposed that LGBT individuals who recall a time they were discriminated against will evaluate the relationship with their closest opposite-sex best friend less positively compared with LGBT individuals in the control condition. Moreover, the relation between perceived discrimination and reports of friendship functioning in LGBT individuals may be moderated by the level of stigma consciousness. We predict that LGBT individuals who score higher on stigma consciousness will evaluate their friendships less positively after recalling a time they were the target of discrimination compared with LGBT members who lower on stigma consciousness.

Ian Barber

Communication and Nonviolence Latin American Peace Activists and U.S. Solidarity Networks

(Presented in collaboration with Brianna Biggers and Nathan Meister)

Psychology & Philosophy (2010)

Provost Fellowship

Faculty Mentor: Dr. Elizabeth Lozano, School of Communication

The purpose of this qualitative study is three fold. First, we will learn about the relationship between spirituality and nonviolence by means of a literature review, specifically Nagler, Sharp, and Zinn's works as well as several authors. Second, we will investigate the relationship between nonviolence and communication specifically looking at the use of dialog by peace activists and solidarity groups. And third, we will explore the meaning of spirituality, as viewed by practitioners of nonviolence. We will conduct interviews with nonviolent practitioners from Latin America and those engaged in solidarity networks in the United States using snowball sampling and theoretical sampling. Those interviews will be conducted either face to face or via telephone. Through the integration of these interviews and our bibliographic research we aim to understand nonviolent practices that are used in Latin America and the functions of solidarity groups in the U.S. We will contribute to the research on solidarity networks in the U.S. in order to aid nonviolent activists in Latin America who intend on coming to the U.S. Through this research, we will contribute knowledge that may further our collective understanding of nonviolence as practice.

Annemarie Barrett

Socially Responsible Investing Research Project

Communication Studies (2012)

Provost Fellowship

Faculty Mentor: Elizabeth Snyderwine, Adjunct Faculty, Loyola University Chicago

This research project provides insight into the use of Negative Screening and Environment Social Governance Screening in the evolution of Socially Responsible Investing. Negative Screening offers investors the opportunity to wash their hands of investments that they believe violate their values. Environmental, Social Governance integration, in contrast, allows investors to evaluate each investment based on an ever-improving standard of ESG responsibility. Particularly at the University level of investing, one must consider what ethical responsibilities are at work within the investment portfolio of the University in order to evaluate these two methods of SRI and how they are most effectively utilized. The moral responsibility of institutional investing, both fiduciary and social, is one that requires the analysis of SRI strategies in order to understand the existing strengths and weaknesses of investment policies.

Steven Bartfield

Mark-to-Market: Setting a Protective Circuit Breaker

Finance, Accounting, and Economics (2011)

Provost Fellowship
Faculty Mentor: Dr. Mine Cinar, Economics

As a continuing amount of banks and financial companies continue to fail, investors' confidence coupled with momentum being bullied up by speculators is forcing risk-averse investors to trade on noise rather than fundamental analysis. I propose a conservative buffer to protect firms and investors from quick, extreme misevaluation of assets. Acting as a circuit break, this model is derived from the effects that investor confidence and market momentum have on inflating a gain or loss during periods of irrational exuberance and driving the price away from its true value. The buffer is set through an asset's market closing price or spot price to the appropriate moving average based on the scope and extent of price change. The objective is to show that providing a conservative buffer will reduce uncertainty and ultimately risk on securities that will protect firms' books from temporary, extreme changes in price.

Erin Berry

Collection and Distribution of Material Needs for Newly Arrived Refugees (Presented in collaboration with Evan Brown, Caitlin Donato, Jessica Cilella, Katherine Kloss, and Annalise Weck.)
Sociology and Anthropology (2012)
Faculty Mentor: Dr. Daniel Amick, Anthropology

Refugees often come to America with limited financial resources and personal possessions. Unexpected living conditions, such as harsh Chicago winters, create further difficulties in acquiring necessities. Material resource needs are substantial but in our experience, the most successful goals for campus organizations involved in refugee resettlement are focused on providing clothing, small children's furniture and toys, and toiletries. Our material procurement efforts have included clothing drives, accepting toiletry donations at bake sales, and use of holiday giving trees. The most challenging aspect of this work is establishing effective networks for material donation and egalitarian structures for material distribution. For example, refugees are invited for "free market shopping" events on campus to help accomplish these goals of fair distribution. The ethical approaches of this charity extended to refugees are founded on the issues of fairness, sharing, and establishing transcendent personal relationships.

Brianna Biggers

Communication and Nonviolence Latin American Peace Activists and U.S. Solidarity Networks
(Presented in collaboration with Ian Barber and Nathan Meister)
Philosophy and Communication (2010)
Provost Fellowship
Faculty Mentor: Dr. Elizabeth Lozano, School of Communication
Please see Barber abstract on page 7.

Emily Brand

Carbon Footprint Diary
Computer Science (2009)
Center for Urban Environmental Research and Policy (CUERP) Fellow
Faculty Mentor: Dr. George Thiruvathukal, Computer Science

The importance of environmental sustainability is increasing tremendously. The Carbon Footprint Diary helps users realize their carbon impact and help them decrease their impact to enable them to live a carbon-neutral, environmentally-conscious lifestyle. As a Facebook Application, users are reminded to track their weekly environmental impact, receive trees planted in their name, and receive daily tips catered to their needs. This application is geared toward the United States, but any user from around the

world can visit the application. It collects information about the environmental impact of different demographic groups to educate users and environmental activists alike in order to advertise to specific demographic groups to encourage them to decrease their impact.

Evan Brown

Collection and Distribution of Material Needs for Newly Arrived Refugees (Presented in collaboration with Erin Berry, Caitlin Donato, Jessica Cilella, Katherine Kloss, and Annalise Weck.)

Anthropology and Environmental Studies (2011)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see *Berry abstract on page 8*.

Griffin Byers

Healthcare Issues in Refugee Resettlement (Presented in collaboration with Jennifer Gambel, Vince Jessen, Sarah Masri, Thanh Ngo, Millie Parkara, and Brian Specht)

International Studies and Political Science (2012)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Refugees in Chicago face many healthcare issues. Current Illinois policy allows Medicaid insurance for nine months after arrival, but existing government programs and agencies have limited resources to assist refugees with their needs. With guidance from the Healthcare Director of the Ethiopian Cultural Association of Chicago, we have implemented preventive health measures through presentations explaining nutrition, sanitation, and chronic disease issues. Through an electronic map, we have provided direction to healthcare professionals in the Chicago-land area that accept patients on Medicaid insurance or who charge on a “sliding scale” based on income. Grant funding from Loyola Student Activities Fund allowed us to develop undergraduate involvement in assembling First Aid/Hygiene kits while educating Loyola students on refugees. These projects helped extend the limited healthcare resources available to resettled refugees, while providing important insights into the healthcare experiences and challenges refugees face in America.

Seemi Choudry

Post slavery, “separate but equal” and racismo- A constitutional analysis of the United States and Cuba before and after abolition

Political Science & Spanish (2010)

Rudis Fellowship

Faculty Mentor: Dr. Peter Sanchez, Political Science

The focus of this study will be to compare the constitutions of the United States and Cuba before and after slavery was abolished. Slavery did not end with abolition and free slaves were not welcomed in either countries. Afro-Cubans and African Americans continuously tried to find their place in society and movements were initiated as a means to expedite the process of acceptance. Throughout the course of my study, I will explore these initiatives and examine sources discussing the impacts of these movements. Furthermore, I will research material written regarding both constitutions and how they secure, or fail to secure, the rights of their citizens. I will analyze the progression over time within the Afro-Cuban and African American community in terms of social mobility and the struggle to find legally sanctioned political support.

Jessica Cilella

Collection and Distribution of Material Needs for Newly Arrived Refugees (Presented in collaboration with Erin Berry, Evan Brown, Caitlin Donato, Katherine Kloss, and Annalise Weck.)

Journalism and Anthropology (2011)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Berry abstract on page 8.

Kate Condic

Campus Fundraising Efforts in Support of Refugee Resettlement (Presented in collaboration with Patricia Davis, Alexis Navratil, Sydney Nielsen, Vikash Patel, and Avjit Shahi)

English (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Because the need for obtaining resources is so severe, fundraising is a critical aspect of our refugee resettlement efforts. In particular, any success in fundraising is directly tied to our abilities to support transportation assistance, critical material needs, and cultural awareness and community social events. We have experimented with several different fundraising strategies and find variation in their success at raising money and raising public attention. In addition to raising funds for purchasing items needed to support the immediate concerns of the refugee resettlement program, we have started a pilot study of micro-grant funding for developing small home businesses relying on self-employment. The fundraising aspect of our campus program also provides practical experience in the development and operation of a small, not-for-profit, service organization. Using this framework, our fundraising program is considered to be under constant evaluation and refinement.

Julissa Cruz

Establishing Refugee Awareness through Inter-Cultural Dialogue (Presented in collaboration with Rob Liss)

Sociology and Anthropology (2012)

Faculty Mentor: Dr. Daniel Amick, Anthropology

This campus program addresses the ability of undergraduate students to serve as facilitators of cultural dialogue, not only between the refugees and the American culture surrounding them, but also between different groups of refugees. We concentrate on engaging the practical implications of the mission of Loyola University of Chicago, to serve as "Persons for Others", through both scholarship and service. Our efforts mainly seek to improve campus understanding on a broad spectrum of refugee issues and to make the Loyola community aware of the presence of a large population of resettled refugees living in our immediate neighborhood. Cultural programming and community building have been created through holiday parties on campus for Loyola students and refugee families, and campus film screenings and panel discussions that highlight refugee issues. The overall goals of these programs are to reduce the marginalization of refugees and for the practical aspect of promoting student-led civic organizations.

Alyse Dalessandro

Moving Forward or Falling Behind? Analyzing Gender Bias in the Media

Journalism and Women and Gender Studies (2010)

Faculty Mentor: Dr. Bastiaan Vanacker, School of Communication

The media frames public opinion on political candidates, but my study examines the use of gender stereotypes and how they were applied to the political candidates during the 2008 election. The study is a direct comparison of print media coverage among Sarah Palin, Joe Biden, Hillary Clinton, and Barack

Obama. The study will determine how fair the media's treatment was of women running for political office.

Patricia Davis

Campus Fundraising Efforts in Support of Refugee Resettlement (Presented in collaboration with Kate Condic, Alexis Navratil, Sydney Nielsen, Vikash Patel, and Avjit Shahi.)

Anthropology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Condic abstract on page 10.

Lauren Del Carlo

Development of ELL Resources for Refugees and Student Volunteers (Presented in collaboration with Margaret Paulson)

Anthropology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Under current policies in the United States, refugees are expected to gain employment and become economically self-sufficient within three months. Learning English as quickly as possible is crucial to interview successfully, get a job, and to navigate American social systems. ELL programs need to confront the language barrier not only to help refugees learn English but also to provide a foundation for further education and to assist in cultural adjustment. Effective programs should not just focus on simple grammar and vocabulary exercises, but include applications of the English language in different cultural settings. Our efforts focused on developing lesson plans and instructional materials specifically tailored for use by student volunteers engaged in ELL efforts with this population.

Connor Dearing

"I'm Lovin' It" Around the World—A cross-cultural comparison of McDonald's Advertising

Communication, International Studies, Asian Studies (2010)

Faculty Mentor: Dr. Pamela Morris, School of Communication

My project will be a merging of two topics—globalization and advertising, & food and culture. Using McDonald's as my case study, I will be looking at the McDonald's websites of ten different countries around the globe. Focusing in on nine specific categories of qualitative comparison, I will be closely examining the homepages and a few additional tabs of these websites. My categories include: imagery/visual layout, food options, English language usage, partnerships, delivery options, presentation of food, and nutritional information. My objective, using the U.S. website as my marker of comparison, is to determine where there are clear differences and in what countries. What do the results say about culture? Do the results challenge or reinforce the hybrid theory of globalization?

Caitlin Donato

Collection and Distribution of Material Needs for Newly Arrived Refugees (Presented in collaboration with Erin Berry, Evan Brown, Jessica Cilella, Katherine Kloss, and Annalise Weck.)

Environmental Studies and Peace Studies (2011)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Berry abstract on page 8.

Sasha Dunaeva

The Role of Monetary Policy In Economic Recoveries

Economics and Mathematics (2011)

Provost Fellowship

Faculty Mentor: Dr. Marc Hayford, Economics

The current recession resumed a major discussion and debate among economists on whether monetary policy is more effective than fiscal policy in facilitating economic recovery. The evidence strongly suggests that monetary policy historically has been more effective in facilitating recovery than fiscal policy primarily because of the obstacles of implementing fiscal policy effectively. The focus of our research was thus monetary policy, in particular how quickly the Federal Reserve responds to economic downturns and how effective monetary policy is in stimulating the economy. By comparing the actual output gap to the estimated output gap assuming no antirecessionary monetary policy during the Great Depression and the past nine recessions, we conclude that monetary policy has been largely, but not entirely effective, in facilitating economic recovery.

Anthony Eames

A Comparative Study on the Development of Polish and English Constitutional Rights until 1832

History and Sociology

Rudis Fellowship (2010)

Faculty Mentor: Dr. Marek Suszko, History

England and Poland have witnessed parallel developments in the field of constitutional rights from their inception in each country until the beginnings of the nineteenth century. England is considered a traditional model of political and constitutional progression. However, much of the current scholarship claims Poland maintained an archaic medieval practices in government and constitutional practices. Comparative analyses of both countries reveal strong similarities in constitutional developments. Focusing on this comparison promotes a new understanding of Polish government and politics. Poland proved to be progressive in the field of constitutional rights, but other factors including geography and aggressive foreign powers placed England and Poland on opposites ends of the European power spectrum by the beginning of the nineteenth century.

Brendan Fitzgerald

Transportation Assistance: The Ride to Success in Refugee Resettlement (Presented in collaboration with Alicia Walter.)

Anthropology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Refugees new to America face an upward battle – we expect them to find employment, pay rent, and feed the family on their own dime within a few months of their arrival. But how can they achieve anything without a thorough understanding of their new home's geography and the basics of local transportation? Recognition of these challenges has led us to develop assistance that supports critical transportation needs. We purchased CTA passes for distribution to refugee clients by the resettlement agency, worked on procuring recycled bikes for refugee families, and made neighbor maps that include the locations of essential community resources relevant to refugee newcomers. The issue of refugee transportation is a constant one, and we have realized that the sooner we are able to teach refugees how to get where they need to go, the sooner they will be able to begin learning how to navigate Chicago on their own.

Jennifer Gambel

Healthcare Issues in Refugee Resettlement (Presented in collaboration with Griffin Byers , Vince Jensen, Sarah Masri, Thanh Ngo, Millie Parkara, and Brian Specht)

Anthropology (2011)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Byers abstract on page 9.

Joseph Guido

Renaissance Humanist Business Education

History and Economics (2010)

Provost Fellowship

Faculty Mentor: Dr. John McManamon, S.J., History

The purpose of this project is to determine the correlation between the humanist and merchant education during the Italian Renaissance. This not only involves studying the overlap in both curricula, but also involves studying the effects that this overlap had on merchant and business students. By analyzing their business affairs, civic leadership, and social contributions, it is possible to determine how the humanist movement impacted business education and practices. A large part of this project has involved studying the system of education that emerged during fifteenth century Italy. After the prominent teachers and students of the curricula have been identified, it is easy to find numerous examples of the impact humanism had on the social, political, economic, and overall civic life of Italian societies.

Bernadett Guy

Numerosity Effect: the influence of financial literacy on share price estimates

Psychology and Political Science (2010)

Faculty Mentor: Dr. Raymond Dye, Jr., Psychology

Money illusion has been the focus of recent research in behavioral finance. The term refers to individuals' tendency to make value judgments based on the numerosity of a certain currency, rather than its actual value within the financial markets. This study seeks to evaluate the influence of experience on money illusion, specifically is increased experience will diminish the magnitude of over and underestimates of stock prices based on numerosities. While there is research to suggest that experience does influence monetary decisions, this study found no significant differences in money illusion between the expert and inexperienced groups. However, it was evident that individuals with financial knowledge consistently picked smaller changes in stock prices than other participants, indicating that experienced individuals believe the markets to be less volatile, especially during earnings reports publications. Further research is needed in order to closer observe financial professionals with extensive experience, compared to those with none.

Jenna Hartung

Housing First Model Fidelity and Implications for Substance Abuse Treatment

Psychology (2011)

Center for Urban Research and Learning (CURL) Fellow

Mentor: Dennis Watson, Research Coordinator, CURL & PhD candidate, Sociology

Housing First is a model for serving homeless individuals who have been dually diagnosed with substance use disorder and serious mental illness. While the model has been associated with higher substance abuse treatment access for clients, it has been recognized that stronger definitions of its essential elements are needed before further investigation into the association between Housing First pro-

programming and substance abuse treatment can be carried out. We have received a two-year grant from the National Institute on Drug Abuse to: (1) define the essential components of the Housing First model; (2) develop a fidelity index for Housing First programming; (3) test the finalized fidelity index for reliability and validity; and (3) assess the degree to which fidelity predicts improved substance abuse treatment access for clients.

Brittany Hocking

In-Depth Look at Domestic Violence Counseling

Social Work and Psychology (2010)

Research Mentoring Program

Mentor: Sonya Crabtree-Nelson, MSW, LCSW, PhD candidate

Intimate partner violence is currently described by trauma researchers as a social epidemic (Briere & Jordan, 2004). The services we have in the United States were largely started 30 years ago by women victims of domestic violence assisting other women. These services centered around safety planning, domestic violence education, legal advocacy, and group counseling. The research clearly states that women survivors of IPV are at an increased risk for depression, anxiety and PTSD when compared to the average population. However, services for victims of IPV remain largely unchanged. Using a phenomenological approach, this study utilizes an exploratory, mixed-methods embedded design to examine the counseling services at domestic violence agencies from the perspectives of both counselors and clients. It looks at the interventions offered and their perceived helpfulness as well as the trauma symptomatology of survivors of IPV and the relationship factors between counselors and their clients.

Kelsey Horton

Assisting Refugee Preparation and Opportunities for Employment (Presented in collaboration with Paige McPhail.)

Environmental Studies (2012)

Faculty Mentor: Dr. Daniel Amick, Anthropology

With the primary goal of US refugee resettlement policy focused on rapid acquisition of economic self-sufficiency, we have initiated programs to assist the Ethiopian Cultural Association of Chicago (ECAC) in that effort. As part of our research, we worked with the Employment Program Manager and Job Developer at the ECAC to align our efforts with the needs of their refugee clients, we investigated the forms of support from local organizations and governmental offices who are involved in refugee and immigrant employment and rights, and we sought out job opportunities on campus. Specific outcomes included developing instructional packets for resume creation, completing employment applications, and navigating the job interviewing process. Interview training and financial literacy programs have emerged as the focal points of these efforts.

Chet Jechura

Behind the Constitutional Veil: Uncovering the Constitutional Rights of Women in the Maghreb

Political Science, Philosophy, and Catholic Studies (2011)

Rudis Fellowship

Faculty Mentor: Dr. Peter J. Schraeder, Political Science

I undertake a comparative analysis of the constitutional guarantees of women living in the Maghreb, which includes Algeria, Morocco, and Tunisia. In each case, the government has undertaken much-heralded reforms designed to strengthen the constitutional guarantees for women. The most far-reaching gender-related reforms in the Maghreb have taken place in Tunisia. These reforms range from

outlawing polygamy and the wearing of the veil while serving in public offices, to education policies that guarantee the universal education of Tunisian women. My research investigates the degree to which the constitutional guarantees for women's rights in the Maghreb are actually matched by substantive policies and policy impacts, most notably the role of Algerian, Moroccan, and Tunisian women in politics. Toward this end, constitutionally inspired gender roles are influenced by a variety of cultural, economic, social, and political factors, each of which are considered in my research.

Vince Jessen

Healthcare Issues in Refugee Resettlement (Presented in collaboration with Griffin Byers, Jennifer Gambel, Sarah Masri, Thanh Ngo, Millie Parkara, and Brian Specht)

Anthropology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Byers abstract on page 9.

Shelena Johnson

Three City Youth Policy Research in Action Project

Sociology and Human Services (2010)

Center for Urban Research and Learning (CURL) Fellow

Faculty Mentors: Philip Nyden, Sociology & CURL Director; Joel Ritsema, PhD Candidate, Sociology & CURL Fellow

In response to the Supreme Court ruling in 2006 that struck race from consideration in school district reintegration initiatives, the Center for Urban Research and Learning (CURL) has partnered with researchers from the University Of Michigan and St. Louis University to conduct youth led participatory action research projects with high school students. To that end, the CURL research team works with a cohort of students from Evanston Township High school in Evanston, IL, providing the students with training in youth led participatory action research for policy change. The curriculum is divided into two modules. In the first module students learn mixed methodological approaches to conducting policy research and how to identify and analyze social problems within their communities. In the second module students learn to compile data and to analyze their findings. The initiative culminates with a policy report and the presentation of their work to various stakeholders.

Katherine Kloss

Collection and Distribution of Material Needs for Newly Arrived Refugees (Presented in collaboration with Erin Berry, Evan Brown, Caitlin Donato, Jessica Cilella, and Annalise Weck.)

Business (2012)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Berry abstract on page 8.

Samantha Lewandowski

Evaluation of Chicago's 10 Year Plan to End Homelessness

Environmental Studies and Sociology (2010)

Center for Urban Research and Learning (CURL) Fellow

Mentors: Julie Hilvers and Julie Davis, CURL Research Coordinators

The Center for Urban Research and Learning, the School of Social Work at Loyola University Chicago and the University of Chicago's School of Social Service Administration have formed a research partnership with the Chicago Alliance to End Homelessness and the City of Chicago to implement an

evaluation of the City's Plan to End Homelessness. Chicago's plan, initiated in 2003, claims to radically transform Chicago's homeless system from one that manages homelessness to one that ends homelessness by moving people quickly into permanent housing. The Plan was the first homelessness intervention strategy of its magnitude officially initiated by a major large city in the United States and has reached its midpoint. With generous funding from numerous foundations, this evaluation seeks to gain an understanding of how Chicago's Plan has affected Chicago's homeless system and how those changes directly impact the lives of the homeless residents it serves.

Rob Liss

Establishing Refugee Awareness through Inter-Cultural Dialogue (Presented in collaboration with Julissa Cruz.)

English (2012)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Cruz abstract on page 10.

Erin Martin

Grounds for Peace: Cosmologies of Land and Violence in Urabá, Colombia

International Studies and Spanish (2010)

Faculty Mentor: Dr. Héctor García, Modern Languages and Literature

This paper analyzes the relationship between concepts of land and violence in the region of Urabá in Northwestern Colombia. From pre-Colombian times to the present-day civil war, multiple forms of violence have been mapped onto the fertile lowlands of the gulf region and are directly related to the conceptualization of the same land that functions as its stage. By linking different concepts of land directly to the violence carried out on that very space from pre-Colombian Cuna populations to the contemporary Chiquita Banana republic, I examine the shaping and reshaping of the human communities that inhabit Urabá and the impact of violence on their agriculture and lifestyles. Finally, this paper presents an analysis of concepts of land in the Comunidad de Paz de San José de Apartadó that provide the grounds for peaceful development. This analysis of land and violence demonstrates the possibility of peace processes through reshaping and reconsidering the nature of earth and its resources in Urabá.

Sarah Masri

Healthcare Issues in Refugee Resettlement (Presented in collaboration with Griffin Byers, Jennifer Gambel, Vince Jessen, Thanh Ngo, Millie Parkara, and Brian Specht)

Anthropology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Byers abstract on page 9.

Paige McPhail

Assisting Refugee Preparation and Opportunities for Employment (Presented in collaboration with Kelsey Horton.)

Anthropology (2011)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Horton abstract on page 14.

Nathan Meister

Communication and Nonviolence Latin American Peace Activists and U.S. Solidarity Networks

(Presented in collaboration with Ian Barber and Brianna Biggers)
Psychology (2010)
Provost Fellowship
Faculty Mentor: Dr. Elizabeth Lozano, School of Communication
Please see Barber abstract on page 7.

Courtney Mikolaycik

Examining Public Views of Prisoners' Work and Pay Opportunities: The Role of Citizens' Characteristics and Justice Perspectives
Psychology and Criminal Justice (2010)
Provost Fellowship
Faculty Mentor: Dr. Loretta Stalans, Criminal Justice

Though there is a large body of research on public views about sentencing criminal offenders, few studies have examined public views about the opportunities for work and pay for inmates while in prison. The public supports punishment that is equivalent in severity to the harm caused, but also wants prisons to prepare offenders to lead law-abiding lives upon release. This project examines a very understudied topic: the public's views about prisoners' work opportunities, wages, payment for room, board, and other amenities, and job training. This study also examines how the public's beliefs about offenders' recidivism, support for rehabilitation compared to retributive justice, and participants' religion, minority status, gender, and age affect their views.

Alexis Navratil

Campus Fundraising Efforts in Support of Refugee Resettlement (Presented in collaboration with Kate Condic, Patricia Davis, Sydney Nielsen, Vikash Patel, and Avjit Shahi.)
Political Science (2010)
Faculty Mentor: Dr. Daniel Amick, Anthropology
Please see Condic abstract on page 10.

Thanh Ngo

Healthcare Issues in Refugee Resettlement (Presented in collaboration with Griffin Byers, Jennifer Gambel, Vince Jessen, Sarah Masri, Millie Parkara, and Brian Specht)
Chemistry (2010)
Faculty Mentor: Dr. Daniel Amick, Anthropology
Please see Byers abstract on page 9.

Katharine Nichols

Beauty: France versus United States
Advertising and Public Relations (2012)
Faculty Mentor: Dr. Pamela Morris, School of Communication

This study was conducted to examine differences in beauty between French and American cultures based on advertisements in each country's magazines. My theory is that French women are beautiful because they spend a great deal of time and money into looking beautiful. They prefer to spend their money on skincare items rather than makeup. In contrast, American women do not practice rigorous skincare treatments and prefer to spend money on makeup to camouflage flaws. To test this theory, I created a coding sheet and coded the advertisements from six French and six American women's magazines. In my coding sheet, I included items such as the number of advertisements for skincare

products, makeup, lotion, and perfume. I also coded if people were present, the facial expressions of those people, and the tone of the advertisement. When all coding sheets are tallied, the results will prove or disprove my theory.

Kendra Petruniw

Majority and Minority Group Member Responses to Discrimination

Psychology (2010)

Provost Fellowship

Faculty Mentor: Dr. Robyn Mallett, Psychology

Because minority group members have more experience than majority group members with interracial interactions, they should typically experience few negative emotions during those encounters. However if the inter-racial interaction is unusual, it might catch minority group members off guard and actually lead to more negative emotions. A daily diary study of 31 majority group members (367 reports) and 12 minority group members (164 reports) showed that the extent to which an interracial interaction was unusual mediated the association between group membership and the experience of negative emotions. The same association was not significant for intra-racial interactions.

Sydney Nielsen

Campus Fundraising Efforts in Support of Refugee Resettlement (Presented in collaboration with Kate Condic, Patricia Davis, Alexis Navratil, Vikash Patel, and Avjit Shahi.)

International Studies (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Condic abstract on page 10.

Millie Parkara

Healthcare Issues in Refugee Resettlement (Presented in collaboration with Griffin Byers, Jennifer Gambel, Vince Jessen, Sarah Masri, Thanh Ngo, and Brian Specht)

Chemistry (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Byers abstract on page 9.

Vikash Patel

Campus Fundraising Efforts in Support of Refugee Resettlement (Presented in collaboration with Kate Condic, Patricia Davis, Alexis Navratil, Sydney Nielsen, and Avjit Shahi.)

Anthropology and Biology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Condic abstract on page 10.

Margaret Paulson

Development of ELL Resources for Refugees and Student Volunteers (Presented in collaboration with Lauren Del Carlo)

Anthropology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Del Carlo abstract on page 11.

Emily Reiher

International Intervention: Post War United States and the Levels of Foreign Involvement in Constitution Writing in the Former Axis Nations

International Studies and History (2010)

Rudis Fellowship

Faculty Mentor: Dr. Ann Harrington, History

Although WWII ended in 1945, the American forces continued to fight on in the Axis Powers, but this time in the political arena. For Japan and Germany, the post WWII decade was a time of foreign control and influence, perhaps most greatly manifested in their constitutions. The Allied Powers gave special attention to Japan and Germany, rather than Italy, in regards to their demilitarization and writing of the post war constitutions. In comparing and contrasting Japan's post WWII constitution and the process of writing it to the constitutions and processes of writing them in Germany and Italy, I hope to examine the true level of influence the US had on them and how the rights given in the constitution reflected western, especially American, ideals. Furthermore, examining the process of writing the constitutions will reveal thoughts on race and international relations. In addition, the content of the constitutions will reveal attitudes towards social and gender issues across these cultures.

Matthew Ruggirello

A Comparative Evaluation of Community Tourism

International Studies and Spanish (2010)

Provost Fellowship

Faculty Mentor: Dr. Peter Sanchez, Political Science

The Huaorani are an indigenous group living deep within the heart of the Ecuadorian Amazon. Outside pressures have increasingly separated the Huaorani from their traditional way of life. In the hopes of benefiting from their interactions with "The West," some Huaorani have worked with loggers, oil companies, missionaries and NGOs. The community of Bameno has initiated a tourism program through which they hope to generate revenue for their village, control their interactions with outsiders and conserve their culture and environment. Moving forward with their initiative, the Huaorani can draw on lessons gathered from community tourism projects across the world.

Avjit Shahi

Campus Fundraising Efforts in Support of Refugee Resettlement (Presented in collaboration with Kate Condic, Patricia Davis, Alexis Navratil, Sydney Nielsen, and Vikash Patel.)

Biology and Sociology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Condic abstract on page 10.

Brian Specht

Healthcare Issues in Refugee Resettlement (Presented in collaboration with Griffin Byers, Jennifer Gambel, Vince Jessen, Sarah Masri, Thanh Ngo, and Millie Parkara)

Biology and Anthropology (2010)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Byers abstract on page 9.

Grace Sutherland

Economic Mentoring Program

Social Work (2010)
Provost Fellowship
Faculty Mentor: Dr. Julia Pryce, School of Social Work

Chicago's Economic Mentoring Program began in 2006 as one of four branches in the nationwide "Mentoring Initiative for System Involved Youth" initiative. The development of the program started by conducting focus groups with mentors, youth, community members, and organizations regarding the need for mentoring relationships in Chicago's under-resourced, south-side communities. The program seeks to use these relationships, specifically the relationship between youth and mentors, to aid system involved youth in developing and maintaining the necessary skills for successful career development, financial literacy, educational achievement, and economic stability. My involvement in the program, beginning in the Fall of 2009, will include working alongside the development team in assessing and developing curriculum, gathering data from the program participants and communities, and assisting in project improvement and progress. My involvement will also allow me to gain experience in three areas that are of particular interest to me, including social policy, community development, and youth services.

Alicia Walter

Transportation Assistance: The Ride to Success in Refugee Resettlement (Presented in collaboration with Brendan Fitzgerald.)

Anthropology and Environmental Studies (2012)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Fitzgerald abstract on page 12.

Annalise Weck

Collection and Distribution of Material Needs for Newly Arrived Refugees (Presented in collaboration with Erin Berry, Evan Brown, Jessica Cilella, Caitlin Donato, and Katherine Kloss.)

Environmental Studies/Mathematics (2011)

Faculty Mentor: Dr. Daniel Amick, Anthropology

Please see Berry abstract on page 8.

Emily Wilk

Experiential Learning Programs: An Exploration of Influences on College Student's Personal and Civic Attitudes

Social Work (2011)

Research Mentoring Program

Mentor: Christine Celio, PhD Candidate, Clinical Psychology

Experiential learning is a field with a long history, but with surprisingly little empirical research. Recently, scholars have been evaluating these programs more rigorously, including better reporting of demographic data on those doing the service, and details into programs, including with which types of organizations students worked. This project presents a recent literature review of experiential learning, including a criticism of the gaps. It also presents some preliminary data of an evaluation completed at Loyola University in the 2008-2009 school year with students in service-learning and internship courses. Conclusions about these types of courses, limitations, and future directions will be presented.

Emily Wilk

Formalized Leadership Programs in Higher Education

Social Work (2011)

Provost Fellowship
Mentor: Dr. John Dugan, School of Education

This presentation examines the relationship between participation in formalized leadership programs and students' capacities for socially responsible leadership. Currently, an array of knowledge about student involvement exists; however, there is a lack in research regarding the types of formalized leadership programs (e.g., workshops, immersion experiences) that best leverage student leadership development. Using data from the Multi-Institutional Study of Leadership, this study attempts to identify the types of formal programs that best leverage student learning.

Children and Families

Christina Amaro

Enhancing Preschoolers' Academic Skills: The Role of Emotion Regulation

Psychology (2011)

Provost Fellowship

Faculty Mentor: Dr. Christine P. Li-Grining, Psychology

Successfully meeting the demands of formal schooling depends on school readiness, a set of skills including emotion regulation, which is defined as the ability to manage one's own emotions. Data will be drawn from the pilot study, Seeds for School Success, which focuses on low-income, ethnic minority preschool-aged children. We will use newly developed observational assessments of preschoolers' emotion regulation and well-validated, reliable measures of children's literacy and quantitative skills. The goal of the pilot research presented here is to examine whether children's emotion regulation explains individual differences in their academic skills. It is expected that there will be a positive correlation between emotion regulation and academic achievement.

Christina Amaro

Preschoolers' Self-Regulation and School Success: Concurrent and Longitudinal Linkages (Presented in collaboration with Maria Marcus)

Psychology (2011)

Mentors: Dr. Christine Li-Grining, Psychology; Kathryn Smagur, Research Assistant; Kelly Haas, PhD candidate, Developmental Psychology

This study examines preschoolers' self-regulation as a predictor of academic skills, social competence, and behavior problems in early and middle childhood. Data will be drawn from three waves of Welfare, Children, and Families: A Three-City Study, a multidisciplinary study on the well-being of low-income children and families in Chicago, Boston, and San Antonio during the era of welfare reform. Preliminary findings suggest that preschoolers' executive functioning is a moderate predictor of academic skills. These results hold across longitudinal models that control for academic skills in early childhood. Discussion of our results will reflect on implications for future research, as well as for prevention and intervention programs targeting the improvement of children's school readiness.

Viviann Anguiano

Ounce of Prevention Fund Community Assessment (Presented in collaboration with Melissa Corzo, Olubukola Olukanni, and Sarah Sarkar)

Sociology (2011)

Center for Urban Research and Learning (CURL) Fellow
Mentor: Maria Guzman , MA, Senior Researcher CURL

The Center of Urban Research and Learning at Loyola University Chicago is collaborating with the Ounce of Prevention to evaluate the Ounce's efforts in various communities as they seek to leverage change for children. The Community Assessment project requires the evaluation team to collect and triangulate various pieces of information from families, participating centers, and public databases. The community assessment reports, which are created every 3 years and updated annually, allow the centers to remain in compliance with HeadStart performance standards. The findings from these assessments can be used to guide program designs and external partnerships while ensuring that the centers are meeting the needs of the community.

Zainub Ashrati

Low-Income Children's Self-Regulation: Risk Factors and Promotion Processes (Presented in collaboration with Donna Flores)

Psychology (2011)

Mentors: Dr. Christine Li-Grining, Psychology and Kathryn Smagur, Research Assistant

Nearly 40% of young children live in low-income families and almost 20% live below the federal poverty line (NCCP, 2006), which is concerning because poverty may undermine children's adjustment by jeopardizing their self-regulation (SR) (Aber, Jones, & Cohen, 2000; Raver, 2004). The proposed project will draw from three waves of Welfare, Children, and Families: A Three-City Study to examine the contribution of child characteristics and risk factors to their SR. We will also analyze the quality of interactions between children and caregivers as predictors of children's SR. Preliminary results indicate that poverty-related risk compromised preschoolers' self-regulation, and that child care providers' harshness and detachment was negatively associated with preschoolers' self-regulation, with a link to delayed gratification and a marginal relation with executive functioning. Discussion of our results will reflect on the roles of caregiving environments, and the multi-contextual nature of children's lives.

Jillian Bruschera

Storytelling and Picturebooks: A Community Resource

Visual Communications and Studio Art: Drawing and Painting (2010)

Provost Fellowship

Faculty Mentor: Patricia Hernes, Fine Arts

Children's literature, particularly picture books, provide a means of understanding diverse cultures, individuals and communities by using the power of images and narrative structure. In most cases our extended grasp of other cultures use words as the currency of understanding. Artists see and think in pictures and images. The strength of images when combined with the written word provide us with a richer interpretive instrument than simply words alone. Working in cohort groups with one artist and two story tellers from the Communications course Community as Story, students will attempt to marry image and text in a short picture book based on experiences arrived at from service participation at the Armstrong School. Art students will decide in consultation with their authors what media is appropriate and what drawing, painting etc. style would most serve the storyline in the books. Small group dynamics will form the lynchpin for the meetings between students from both disciplines.

Michael Budd

Storytelling and Picturebooks: A Community Resource

Communication (2010)

Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies

The purpose of this project is to understand the intersection of narrative, community and identity. It uses children's literature, specifically picture books, as a means of understanding urban community and individual identities within that community. Students used ethnographic research, service learning at Armstrong School, and performance of existing children's literature to create their own children's picture books in collaboration with experienced student artists. (Students will be presenting with the student artists, who were mentored by Dr. Patricia Hernes.)

Melissa Corzo

Ounce of Prevention Fund Community Assessment (Presented in collaboration with Vivian Anguiano, Olubukola Olukanni, and Sarah Sarkar)

Sociology (2010)

Center for Urban Research and Learning (CURL) Fellow

Mentor: Maria Guzman, MA, Senior Researcher CURL

Please see Anguiano abstract on page 21.

Jessica Danduran

Storytelling and Picturebooks: A Community Resource

Fine Arts with concentration in Drawing and Painting (2010)

Provost Fellowship

Faculty Mentor: Patricia Hernes, Fine Arts

Please see Bruschera abstract on page 22.

Akta Desai

Year Round schools vs traditional schools: Who Scores better?

Secondary Education- Mathematics (2011)

Research Mentoring Program

Mentor: Andrea Winkelman, PhD candidate, Education Psychology

We researched year-round schools and traditional schools at the 4th-grade level to see who scored better on ISAT tests and back to school assessments.

Jessie Duncan

Understanding the Socialization of Children's Self-Regulation Across Multiple Contexts (Presented in collaboration with Sophie Mir)

Psychology (2012)

Mentors: Dr. Christine Li-Grining, Psychology; Kathryn Smagur, Research Assistant; Kelly Haas, PhD candidate, Developmental Psychology

Children's self-regulation (SR) has emerged as a predictor of positive mental health, behavioral, and scholastic outcomes. The project will investigate children's SR as a function of child, family, and classroom characteristics. It will draw from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development, a longitudinal study of approximately 1,000 children. Preliminary results indicate SR is negatively correlated with maternal hostility and negative classroom climate. Positive correlations were seen between children's SR and mothers' use of firm discipline practices. Further analyses will test similarities and differences across race/ethnicity groups. The study will inform family- and classroom-based interventions aimed at reducing children's dysregulated behaviors.

Dana Elborno

Storytelling and Picturebooks: A Community Resource

Journalism and Islamic World Studies (2010)

Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies

Please see Budd abstract on page 22.

Asia Elsner

Storytelling and Picturebooks: A Community Resource

Advertising and Public Relations (2012)

Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies

Please see Budd abstract on page 22.

Donna Flores

Low-Income Children's Self-Regulation: Risk Factors and Promotion Processes (Presented in collaboration with Zainub Ashrati)

Psychology (2012)

Mentors: Dr. Christine Li-Grining, Psychology and Kathryn Smagur, Research Assistant

Please see Ashrati abstract on page 22.

Andrea Green

Storytelling and Picturebooks: A Community Resource

English (2010)

Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies

Please see Budd abstract on page 22.

Dora Guzman

Improving the Advocacy and Support of Parents of ELL Students

Bilingual Elementary Education (2010)

Provost Fellowship

Faculty Mentor: Dr. Marla Susman Israel, School of Education

The Chicagoland Partnership for English Language Learners (CPELL), funded by the U.S. Department of Education, involves 4 large school districts in the Chicagoland area that have distinct populations of ELL students in their schools. In addition to the unique Master's program, CPELL offers several components that are designed to build the leadership skills of school administrators, teachers, and parents of ELL students in the participating district schools. Some of the interactive workshops are held on-site at participating district schools for parents of ELLs. These sessions are intended to better equip parents to support and advocate for the academic achievement of their children. Additionally, parent focus groups and surveys provide feedback on parent sessions and how the program impacts their children. My research project will primarily focus on suggestions, as a result of parent data analysis, in improving the effectiveness of parent sessions in one of the participating districts.

Margaret Jarosz

Storytelling and Picturebooks: A Community Resource

Political Science, Islamic World Studies and Peace Studies (2010)

Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies

Please see Budd abstract on page 22.

Ashley Kaneko

Storytelling and Picturebooks: A Community Resource
Visual Communications (2010)
Provost Fellowship
Faculty Mentor: Patricia Hernes, Fine Arts
Please see Bruschera abstract on page 22.

Molly Keiffer

Storytelling and Picturebooks: A Community Resource
International Film (2010)
Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies
Please see Budd abstract on page 22.

Audie Lomboy

Storytelling and Picturebooks: A Community Resource
Music (2010)
Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies
Please see Budd abstract on page 22.

Lana Larcher

COUNTDOWN Tutoring in Chicago Public Schools
Elementary Education (2012)
Provost Fellowship
Faculty Mentor: Dr. Diane Schiller, School of Education

This project focuses on education in CPS and other urban areas. We wanted to know if computerized tutoring is as effective in the elementary grades as tutor to student tutoring. For our experiment, we broke our students up into two groups. One participated in COUNTDOWN tutoring, which is computerized. The other group participated in Measure Up!, a tutor to student program based on an ISAT prep book. The students worked in groups of six with one Loyola undergraduate tutor to aid them in this process. The research shows that one method of tutoring is not significantly better than the other type of tutoring. This research is groundbreaking because it could mean a revolution in tutoring as far as outreach and cost-effectiveness are concerned.

Maria Marcus

Preschoolers' Self-Regulation and School Success: Concurrent and Longitudinal Linkages (Presented in collaboration with Christina Amaro)
Psychology (2011)
Mentors: Dr. Christine Li-Grining, Psychology; Kathryn Smagur, Research Assistant; Kelly Haas, PhD
Please see Amaro abstract on page 21.

Margaret McCoy

Intervention in Science through Targeting New Transitions
Biology, B.S. and Secondary Education, M.Ed. (2010)
Provost Fellowship
Mentor: Mary Charles, School of Education

The goal of this project, Intervention in Science through Targeting New Transitions, is two-fold: first, to create and implement effective supplementary science materials that can be used productively by any academic coach, even those without any special or advanced knowledge in science to support the Curie freshmen who attend Targeting New Transitions (TNT); second, to test the efficacy of these targeted science materials in building the science comprehension and raising the grades of the freshmen who come to TNT for help in science. The supplementary science materials will be created in fifteen separate units, each on a different topic, based on student need and curricular guidance from the science department at Curie Metropolitan High School.

Katie McDermott

Storytelling and Picturebooks: A Community Resource
Studio Art: Painting/ Drawing (2011)
Provost Fellowship
Faculty Mentor: Patricia Hernes, Fine Arts
Please see Bruschera abstract on page 22.

Sophie Mir

Understanding the Socialization of Children's Self-Regulation Across Multiple Contexts (Presented in collaboration with Jessie Duncan)
Psychology (2012)
Mentors: Dr. Christine Li-Grining, Psychology; Kathryn Smagur, Research Assistant; Kelly Haas, PhD candidate, Developmental Psychology
Please see Duncan abstract on page 23.

Stephanie Mrowiec

Storytelling and Picturebooks: A Community Resource
Fine Arts (2010)
Provost Fellowship
Faculty Mentor: Patricia Hernes, Fine Arts
Please see Bruschera abstract on page 22.

Olubukola Olukanni

Ounce of Prevention Fund Community Assessment (Presented in collaboration with Viviann Anguiano, Melissa Corzo, and Sarah Sarkar)
International Studies (2011)
Sociology (2010)
Center for Urban Research and Learning (CURL) Fellow
Mentor: Maria Guzman, MA, Senior Researcher CURL
Please see Anguiano abstract on page 21.

Lauren Parente

Incorporating Argumentation into the Science Classroom: Using Persuasive Writing Instruction as a Model
Special Education (2010)
Provost Fellowship
Faculty Mentor: Dr. Leah Bricker, School of Education

“Young People’s Everyday Encounters with Science and Technology” is a study (Bell, et al., 2006) that has sought to understand students’ science and technology learning across multiple settings (e.g., home, school, museums). Part of this research involved forming a partnership with an elementary school and when the study was in its second year, researchers collaborated with teachers to re-design a science unit. The implementation of this unit was video-taped, as was other related instruction (e.g., persuasive writing). This analysis examined video tape of persuasive writing instruction in order to understand how strategies used can be applied to engaging students with how to argue scientifically in school science classrooms. Specifically, an analysis of persuasive writing instruction as compared to an analysis of the science education literature relative to argumentation has been conducted.

Judith Rodriguez

Improving the Advocacy and Support of Parents of ELL Students
Bilingual/Bicultural Elementary Education (2010)
Provost Fellowship
Faculty Mentor: Dr. Marla Susman Israel, School of Education
Please see Guzman abstract on page 24.

Kristen Salkas

Preschoolers’ behavior problems, family demographics, and classroom contexts: A comparison between CSRP and FACES
Psychology and Spanish (2009)
Faculty Mentor: Dr. Christine Li-Grining, Psychology

The current study investigates differences in child characteristics, family demographics, and classroom contexts between two samples of Head Start preschoolers, the Chicago School Readiness Project (CSRP) and the Family and Child Experiences Survey (FACES) in order to determine whether or not the CSRP intervention, which successfully reduced Head Start preschoolers’ behavior problems, could be expanded nationally. The CSRP sample (N=440) represents Head Start children drawn from low-income, ethnic minorities in the city of Chicago. The FACES sample (N=1545) is a nationally-representative sample of Head Start children from across the country. Significant differences were found in seven out of the eight family and classroom characteristics compared between the two samples. ECERS-R score indicating classroom quality was the only nonsignificant finding. More research is needed to determine whether or not the intervention would be successful in stifling Head Start preschoolers’ behavior problems if implemented at the national level.

Angielyn San Juan

Implicit Self-Esteem as a Predictor of Nonverbal Anxiety in Relationship Conflict
Psychology and Biology (2010)
Research Mentoring Program
Mentors: Julie Longua, PhD candidate in Clinical Psychology and Dr. Tracy DeHart, Psychology

It has become increasingly clear that people carry implicit (unconscious, overlearned, and relatively uncontrolled) beliefs about the self, known as implicit self esteem (see Koole & DeHart, 2005, for a review). Because of the nature of implicit self-esteem, this type of self-esteem is likely to predict automatic and uncontrolled behaviors, such as nonverbal behaviors. Research by Spalding and Hardin (1999) showed that, during a threatening interview, participants’ implicit self-esteem predicted their levels of nonverbal anxiety. Though such findings have highlighted the relationship between implicit self-esteem and nonverbal anxiety, there exists no previous research that has explored how implicit self-esteem influences anxiety during a threatening romantic relationship interaction. In our current study, we hoped to extend

these findings to romantic relationship threat by exploring whether implicit self-esteem predicts nonverbal anxiety during romantic relationship conflict.

Sarah Sarkar

Ounce of Prevention Fund Community Assessment (Presented in collaboration with Viviann Anguiano, Melissa Corzo, and Olubukola Olukanni)
English (2012)
Center for Urban Research and Learning (CURL) Fellow
Mentor: Maria Guzman, MA, Senior Researcher CURL
Please see Anguiano abstract on page 21.

Sarah Shepherd

Storytelling and Picturebooks: A Community Resource
Advertising/Public Relations and English (2012)
Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies
Please see Budd abstract on page 22.

Kelly Silay

Explicit and Implicit Self-Esteem Predict Verbal and Nonverbal Behavior During Relationship Conflict
Psychology (2012)
Provost Fellowship
Mentors: Julie Longua, PhD candidate in Clinical Psychology and Dr. Tracy DeHart, Psychology

Research has demonstrated the importance of exploring romantic relationship threat (i.e. conflict) in terms of physical and mental health outcomes (Bloom, Asher, & White, 1978) as well as in satisfying human motivations (Baumeister & Leary, 1995). The current study explores the effects of explicit (i.e. conscious, controllable) and implicit (i.e. unconscious, uncontrollable) self-esteem on verbal (i.e. conscious, deliberate) and nonverbal (i.e. unconscious, automatic) behavior during romantic relationship conflict discussion. Specifically, we explore how explicit self-esteem is depicted through verbal behavior and how implicit self-esteem is depicted through nonverbal behavior (Spalding & Hardin, 1999). In exploring these ideas, we investigate possible predictors for relationship dissatisfaction and dissolution and provide future application for improving health in regards to relationship dissatisfaction and dissolution.

Naomi Titean

A new method of tutoring: COUNTDOWN
Elementary Education (2012)
Provost Fellowship
Faculty Mentor: Dr. Diane Schiller, School of Education

Chicago Public Schools have the shortest school day in the nation. Since these students are not able to spend as much time in an academic environment an effective way to enhance their learning is through tutoring. Various methods of tutoring are available, however these methods can be costly and unsuccessful. COUNTDOWN is a method of tutoring that uses Quicktime math videos paired with matching worksheets to teach a math concept. This method is cost-efficient and provides individualized teaching for each student based on the previous year's Illinois Standard Achievement Test scores. This project observes students' progress in mathematics over the school year and measures the effectiveness of tutoring.

Laura Wagner

Storytelling and Picturebooks: A Community Resource

English (2010)

Faculty Mentor: Dr. Bren Ortega Murphy, School of Communication and Women's/Gender Studies

Please see Budd abstract on page 22.

Laura Wardell

Storytelling and Picturebooks: A Community Resource

Studio Art: Drawing and Painting (2011)

Provost Fellowship

Faculty Mentor: Patricia Hernes, Fine Arts

Please see Bruschera abstract on page 22.

Miles Wisniewski

Storytelling and Picturebooks: A Community Resource

Fine Arts: Drawing and Painting (2010)

Provost Fellowship

Faculty Mentor: Patricia Hernes, Fine Arts

Please see Bruschera abstract on page 22.

Nicholas Wojciak

Target New Transitions' Effect Academic Performance on Freshmen at Curie Metro High School

Spanish and Economics (2011)

Provost Fellowship

Mentor: Mary Charles, School of Education

The purpose of this research project is to measure the efficacy of Loyola's Target New Transitions (TNT) Program on high school academic performance in freshmen. By analyzing TNT's effects, this research will provide data that allows the Academic Coaching program to continue to develop in a positive manner and that will buttress the falling graduation rates at Curie High School, while highlighting the positive impact Loyola University Chicago can have in the larger Chicago Community.

Darlene Zouras

Storytelling and Picturebooks: A Community Resource

Studio Art: Drawing and Painting (2011)

Provost Fellowship

Faculty Mentor: Patricia Hernes, Fine Arts

Please see Bruschera abstract on page 22.

Natural and Life Sciences and Healthcare

Sean Arora

Synthesis of Biological receptor sites

Biochemistry (2011)

Mulcahy Scholar

Mentors: Dr. Richard Holz, Chemistry and Zachary Osner, graduate student, Chemistry

Edith Arteaga

Promoting Self-Care in Urban African-American Teens with Asthma

Nursing (2010)

Provost Fellowship

Faculty Mentor: Dr. Barbra Velsor-Friedrich, Nursing

Asthma is the most prevalent chronic illness in childhood, affecting nine million youth under the age of 17 years. This study, implemented by a multi-disciplinary team, will address these issues by providing a comprehensive asthma program that is developmentally appropriate for urban African-American adolescents with asthma. The objective of this study is to evaluate the efficacy of the school-based program TEAM (Teen Educational Asthma Management) on the self care and quality of life of urban African-American teens with asthma. The TEAM program is composed of asthma education, coping skills training and nurse practitioner re-enforcement visits. The specific aims are to evaluate the efficacy of this intervention on asthma self care and asthma-related quality of life; asthma knowledge, asthma self-efficacy, coping and asthma health outcomes. The findings of this study will improve care to this underserved population of urban African-American teens with asthma and will have significant implications for health care providers, researchers, and policy makers.

Mary Ayers

Denitrification in Cave Pseudomonades

Biology (2011)

Mulcahy Scholar and Biology Summer Research Fellowship

Faculty Mentor: Dr. Domenic Castignetti, Biology

An oligotrophic environment is one that has less than two milligrams of total organic carbon per liter. In oligotrophic environments, such as caves, how nutrients are cycled is not well understood. We are analyzing isolates from a Venezuelan for their capabilities to perform aspects of the nitrogen cycle. The nitrogen cycle is a process in which gaseous nitrogen is taken from the air and made available to organisms. The process of denitrification reduces nitrate to nitric oxide and nitrous oxide, then back into atmospheric nitrogen. Not all organisms are capable of performing denitrification. Specific enzymes must be synthesized to denitrify; the genes nirS and nirK code for the signature enzyme of this pathway, nitrite reductase, which reduces nitrite to nitric oxide. Ammonification is the reduction of nitrite to ammonia, a reaction catalyzed by a different nitrite reductase, nrfA. Whether denitrification or ammonification is able to occur is important to knowing how nitrogen is cycled in the cave.

Jennifer Baltes

Ligand-Binding Pathways in Barley Hemoglobin

Biology (2010)

Mulcahy Scholar and Provost Fellowship

Faculty Mentor: Dr. Kenneth Olsen, Chemistry

Hemoglobin (Hb) is familiar as a component of human blood, but is present in all kingdoms of life. In plants, Hb can be an oxygen-sensing or –transporting protein depending on the structure of the heme group. Barley hemoglobin (BarHb) serves as an evolutionary link between the two classes' differing structures. The focus of this research was to investigate how molecules of oxygen bind to and exit from BarHb. Virtual copies of the protein were analyzed using Locally Enhanced Sampling Molecular Dynamics (LESMD), which mathematically predicts the most energetically favorable pathway for the molecules to exit the protein. I examined the oxygen's exiting pathways and determined the fifty-third residue, a phenylalanine, to be key to the exit pathway. This was confirmed by replacing the residue with a tyrosine and rerunning the simulation. The molecule's exit path had changed significantly, indicating that the phenylalanine was crucial to maintaining the pathway. In the future, this mutant may be created in the lab to investigate the effect on a living organism.

Catherine Juan Bartlett

Childhood Obesity: A Serious Problem in Cook County (Presented in collaboration with Sophia Anne Hoesch, Alexandra Johnson, and Pik Ki (Kimberly) Tang.)

Health Systems Management (2010)

Faculty Mentor: Dr. MaryMargaret Sharp-Pucci, School of Nursing

The purpose of this exploratory study is to identify: high-risk communities and contributing factors for childhood obesity in Cook County, programs shown to prevent/manage childhood obesity, and the range of public policies aimed at obesity prevention/management. The Public Health Status and Forecast Model served as theoretical framework. A policy review, literature review and review of secondary data were performed. Data were extracted from secondary sources and synthesized. Three communities with highest reported prevalence of childhood obesity/overweight were analyzed further. Lifestyle preferences, community violence, and parental role were evident as contributing factors. Multiple prevention programs were identified but characterized by low utilization. Multiple federal policies supportive of obesity prevention were identified but have not been implemented at state or local levels. Childhood obesity/overweight is a multifactorial problem requiring systematic exploration. Community-based research and clarification of policy and prevention strategies are necessary to understand population-specific causative factors and identify successful interventions.

Gurmeet Bawa

Effects of the Beta-Adrenergic Antagonist Propranolol on Memory after Chronic Stress

Molecular Biology (2010)

Biology Summer Research Fellowship

Faculty Mentor: Dr. Louis Lucas, Biology

This study aimed to examine the effects of the beta-adrenergic antagonist propranolol on memory retention after a chronic stress exposure. Previous studies have demonstrated a detrimental effect of chronic stress on the performance of male rats on spatial memory. It has been shown that an exposure to chronic stress effectively hinders the capability of cognitive function through damage of the hippocampus, which is known to play an important role in learning and memory. During a stressful event the catecholamines adrenaline and noradrenaline are released by the adrenal glands. They are thought to act on the hippocampus to alter neuronal plasticity. Because propranolol can cross the blood-brain barrier, we hypothesized that propranolol may be able to protect memory by preventing plastic changes in the hippocampus due to stress.

Krishna Bharani

Allosteric Mechanisms of Effector Binding on ADP-glucose Pyrophosphorylase

Biochemistry and Mathematics (2011)

Carbon Scholar

Faculty Mentors: Dr. Kenneth Olsen, Chemistry and Dr. Miguel Ballicora, Chemistry

ADP-glucose pyrophosphorylase (AGPase) is an essential allosteric enzyme that catalyzes the bacterial glycogen and plant starch synthesis. This enzyme is regulated by the ratio of activator, 3-phosphoglycerate, to inhibitor, inorganic phosphate and has a receptor site ("allosteric site") that does not compete with its catalytic site. Studies done in Ballicora's lab have suggested that mutagenesis of amino acids near to the allosteric site has effects on the catalytic ability of the enzyme. These mutant enzymes are catalytically functional but do not respond to the activator even though it retains its ability to accept the activator. Using computational programs such as NAMD and VMD, we can model and run simulations on ADP-glucose pyrophosphorylase and its mutants to gain a better understanding of catalytic and regulatory kinetics of the molecule. This computational study will be followed up with wet chemistry in Ballicora's lab.

Ernest Chan

The Structure of the Subtelomeric Region of Human Chromosome 21p

Pre-Health Post-Baccalaureate Program, 2010

Biology Summer Research Fellowship

Faculty Mentor: Dr. Jeffrey Doering, Biology

We are creating a detailed physical map of the centromere and p-arm of HC21 as a model for the organization of such regions. Little is known about the organization of the telomeric region in the human acrocentric p-arms. Previous studies have identified a novel weakly conserved tandem repeat of 147bp on chromosome 21p and a 580bp sequence (Thoraval et al) on the subtelomeric region of all acrocentric chromosomes. With these results, we identified a contig containing both of these sequences. Further investigation showed that this contig is a 6.3kb repeat, and we are now cloning it from HC21. To determine the organization of the telomere adjacent to the 580bp sequence we used the telomere-anchored PCR procedure on total human DNA at a lower stringency than previously used, so as to yield more PCR product. The collection of sequences obtained show a 99% similarity, suggesting differences between chromosomes.

Jennifer Cox

The Evolutionary Mechanisms Responsible for Nucleotide Sequence Correspondence Between Phages and Their Hosts

Biology (2009)

Biology Summer Research Fellowship

Faculty Mentor: Dr. Catherine Putonti, Biology and Computer Science

Computational analysis of viral pathogen and host genomic sequences has revealed similarities in the preferred usage of particular codons. Since many of the smaller viral pathogens are entirely dependent upon host machinery, it has been postulated that they are under selection for a composition similar to that of their host. In a recent study by Coleman et al. (2008), a section of the capsid protein of poliovirus was altered to contain underrepresented codon pairs based on the codon bias of the human genome. The resulting viruses showed a decrease in translation rates and were consequently less virulent within the host suggesting it's possible use as a vaccine. The results of this study prompted us to ask: To what degree an engineered pathogen would be under selection to return to a host-like composition? Using the model system of the small viral bacteriophage ϕ X174 and its host *Escherichia coli* C, a ϕ X174 mutant was engineered in which a segment of the phage's capsid gene F was changed to include underrepresented codons of its host species. Three replicates of the mutant ϕ X174 strain were propagated for

many thousands of generations with its host *E. coli* C over 21 days. Sequencing of the strain was conducted throughout this time. The results of our sequencing revealed that many of the codons which were altered reverted back to the codon of the ancestor strain. The rate of reversion was found to correspond with the relative fitness of the phage. This suggests that codon usage not only corresponds with virulence but that the phage is in fact under strong selective pressure to utilize the host biases.

Malcolm DeBaun

A Molecular Based Diagnostic Method to Elucidate Bloodstream Pathogens

Biology (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Catherine Putonti, Biology and Computer Science

Sepsis is a serious medical condition caused by infection of foreign organisms in the bloodstream. These various pathogens, be it fungal, bacterial or viral can cause an unbalanced and sometimes fatal activation of the immune and inflammatory systems, leading to septic shock. In order to treat septic shock effectively one must efficiently discern the cause of infection amongst a group of potential infectious agents. Using a computational approach we compared the genomes of potential agents against each other and with human DNA to isolate unique DNA sequences specific to that organism. By developing primers specific to that infectious agent, PCR can be used to identify the potential cause of sepsis within a complex human sample.

Kyle Duckert

Shocks and Patterns in Granular Hydrodynamic Simulations

Physics and Mathematics (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Jon Bougie, Physics

Systems composed of solid, macroscopic, interacting particles are known as granular materials. Physical examples include sand in an hourglass or wheat in a grain hopper. Our research group is investigating granular systems and seeking to contribute to the development of a successful theory of granular hydrodynamics. My particular work in the group is to examine two physical phenomena in a fluidized granular system. I investigate a system in which a substance composed of granular particles is oscillated sinusoidally. The substance becomes fluidized, and I analyze its behavior by numerically solving a set of fluid equations. Energy that propagates in this system supersonically is considered to be a shock. I analyze the correlation between this phenomena and emergent patterns that are produced in this system.

Patrick Ennis

Promoting Self-Care in African-American Teens with Asthma

Biology and Psychology, 2010

Provost Fellowship

Faculty Mentor: Dr. Maryse Richards, Psychology

Asthma is the most prevalent chronic illness in childhood, affecting nine million youth under the age of 17 years. This study, implemented by a multi-disciplinary team, addresses these issues by providing a comprehensive asthma program that is developmentally appropriate for urban African-American adolescents with asthma. The objective of this study is to evaluate the efficacy of the school-based program TEAM (Teen Educational Asthma Management) on the self-care and quality of life of urban African-American teens with asthma. The TEAM program is composed of: 1) asthma education, 2) coping skills

training and 3) nurse practitioner re-enforcement visits. The specific aim of this project is to evaluate the gender differences found in coping techniques as reported on a culturally sensitive measure. A total of 134 African-American adolescents with persistent asthma are enrolled in the study. The coping differences are analyzed based on baseline data from Year 3 of the study. The findings of this study will improve care to this underserved population of urban African-American teens with asthma and will have significant implications for health care providers, researchers, and policy makers.

Elizabeth Ernst

The Synthesis of Synthetic Receptor Molecules for Biological Sensors

Biochemistry (2010)

Mulcahy Scholar and Provost Fellowship

Faculty Mentor: Dr. Daniel Becker, Chemistry

The goal of my current project is to add a chiral moiety to the cyclotrimeratrylene lactam to enable resolution of the chiral molecule into its mirror-image enantiomers. This bowl-shaped conformation offers potential uses as a synthetic biological receptor for biological sensors. This enters into the arena of host-guest chemistry, in which the molecule in question emulates a receptor for receptor-ligand binding interactions in biology and strives for exquisite selectivity with applications in communication and signaling. After attempting several reactions with different chiral moieties under different conditions, addition of menthylxyacetic acid chloride to the CTV lactam proved successful as judged by TLC and ¹H-NMR. ¹H-NMR also showed a 87:13 ratio of diastereomers. Crystals were formed, enabling structure determination through X-ray crystallography, details of which will be presented. Facile hydrolysis of the acyl chiral auxiliary, and kinetics of racemization will be determined through an optical rotation study.

Melissa Fernandes

Medical Interpretation: Can it be effective? (Presented in collaboration with Erin Martin.)

Math and Spanish (2010)

Faculty Mentor: Dr. Wiley Feinstein, Modern Languages and Literatures

This research analyzes the urgent need for medical professionals with Spanish language skills as an alternative to using an interpreter as a mediator between the patient and the medical professional. Through examining the deficiencies of medical translating, the research concludes that due to linguistic, medical, and cultural factors, medical professionals with a background in Spanish are imperative to accurate patient care. Though interpreters can be a part of improving the medical care for patients with limited English, employing trained medical professionals- doctors, nurses, EMTs, PCTs, CNAs, etc. - who have basic to intermediate knowledge of Spanish is just as important as hiring skilled interpreters. The presence of such individuals would allow medical professionals to better understand what the interpreter is translating and not rely completely on the translator to understand the patient. In doing so, the medical workplace today would better provide adequate care to a large percentage of the US population.

Jennifer Gomulka

Does Eph/ephrin signaling contribute to the targeting of sensory nerves in the postnatal and adult rat and mouse tongue?

Biology (2011)

Mulcahy Scholar and Biology Summer Research Fellowship

Faculty Mentor: Dr. William Rochlin, Biology

Eph receptors and ephrin ligands play an important role in axon targeting during initial innervation. Im-

munohistochemistry was used to determine if Eph/ephrins may be involved in axon targeting during remodeling in maturing rodents. EphA7 is concentrated within the papillae core in juvenile/adult rats and adult mice. EphA5 expression in the non-taste epithelium and taste bud is seen in juvenile/adult rats. Similarly, ephrin-A2 is found in the non-taste epithelium directly above the taste bud and within the taste bud of juvenile rats. EphB1, B2, and B3 and ephrinB1 expression is detected in the same subpopulation of taste bud cells. None of the Ephs/ephrins were detected in axons. This does not support our hypothesis, but we have not checked for all Ephs and ephrins and will be using in situ hybridization to improve Eph/ephrin detection. Our data support a role of Eph/ephrin signaling among epithelial cells in taste buds and non-taste epithelia.

Tanya Grancharova

Impacts of Invasive Typha on Denitrifier Communities in Freshwater Wetland Sediments

Molecular Biology and Philosophy (2010)

Mulcahy Scholar and Women in Science Enabling Research (WISER)

Faculty Mentor: Dr. John Kelly, Biology

Wetlands are located at the transitions between terrestrial soil and surface waters and can remove nitrogen before it enters bodies of water. Nitrogen removal depends on the activity of wetland plants and microorganisms, including denitrifying bacteria. Many wetlands in the Midwest have been invaded by aggressive exotic plant species that have significantly altered wetland habitats. These habitat changes have the potential to impact nitrogen removal and the activity of denitrifying bacteria. This study examines the impact of an invasive *Typha* species on the rates of denitrification and the composition of denitrifying bacterial communities at the Cowles Bog Wetland Complex in the Indiana Dunes National Lakeshore. This wetland has been invaded by the exotic cattail species *Typha angustifolia* and *Typha x glauca*, an aggressive hybrid of *T. angustifolia* and the native cattail *Typha latifolia*. Denitrification rates were measured in wetland sites dominated by native plants, invasive plants, and mixtures of natives and invasives. There were significant differences in rates of denitrification, with the site dominated by *T. angustifolia* having the highest rate (6.3 nmol N₂O/gram/day). Vegetation type had a significant effect ($p < 0.004$) on the number of denitrifiers in wetland sediments as indicated by nirS copy numbers determined by quantitative PCR (Q-PCR). Sediments from the native site had significantly higher nirS copy numbers than those from the restored, *T. glauca*, and *T. angustifolia* sites. NirS copy numbers for the restored site, which had the *T. glauca* herbicided and native replanted, were not significantly different from those found at the *T. glauca* sites. These results indicate that the invasive plants are having a significant impact on the denitrifying bacterial communities within the Cowles Bog Wetland Complex.

Jeff Graupner

Affective (In)Coherence Regulates the Effect of Persuasion

Psychology (2010)

Provost Fellowship

Faculty Mentors: Dr. Robyn Mallett, Psychology and Dr. Jeffrey Huntsinger, Psychology

Affective coherence occurs when affective feelings and affective concepts are aligned; affective incoherence occurs when such feelings and concepts conflict. Although past research indicates that affective coherence has epistemic benefits, the present research explores whether affective coherence impacts cognition much like positive and negative moods. To this end, I examined the influence of affective coherence on persuasion. In two experiments, affective coherence was manipulated and participants read a strong or weak persuasive appeal. The outcome of interest was participants' attitudes toward the position advocated in the message. Because past research demonstrates that mood shapes persuasion differently depending on whether it is induced before or after reading a persuasive appeal, I varied whether affective coherence was induced prior to (Study 1) or after (Study 2) participants read the persuasive

appeal. Results from both studies confirmed predictions— affective coherence had effects identical to positive mood whereas incoherence had effects identical to negative mood.

Steffen Haaker

The Automated Theater of Heron: Reconstructing a Technological Wonder of Hellenistic Alexandria
Classical Civilizations (2010)

Provost Fellowship

Faculty Mentor: Dr. Laura Gawlinski, Classical Studies

Heron of Alexandria, a Hellenistic inventor, created an automated theater. In order to better understand this technological wonder, I have recreated the base structure of his theater as authentically as possible according to the evidence available. For the first step of this project I translated and analyzed the ancient text attributed to Heron and did research within the field of ancient technology. Next I reconstructed the theater itself in order to provide insight into the inner workings of the mechanics of the device. Since this is a product of ancient technology, I have also researched which materials would have been appropriate to use at the time of its original construction. Through the process of reconstruction, the nature of this technology and the talents of ancient engineers have been clarified beyond the textual evidence.

Daniel Harris

Mapping The Histone Modifications within HC21p

Biology (2011)

Mulcahy Scholar

Faculty Mentor: Dr. Jeffrey Doering, Biology

The goal of my project is to map the various histone modifications within the short arm of human chromosome 21. This region of the genome has always been considered heterochromatic, however sequence identity reveals that some regions might be euchromatic. By determining the histone modifications, it can be deduced whether a region is heterochromatic or euchromatic. In order to do this I will use a procedure called chromatin immunoprecipitation (ChIP). This technique uses specific antibodies to bind to histones specific to either heterochromatic regions or euchromatin regions. By mapping these various histone modifications, a more complete map of the short arm of chromosome 21 will be produced.

Sophia Anne Hoesch

Childhood Obesity: A Serious Problem in Cook County (Presented in collaboration with Catherine Juan Bartlett, Alexandra Johnson, and Pik Ki (Kimberly) Tang.)

Health Systems Management (2010)

Faculty Mentor: Dr. MaryMargaret Sharp-Pucci, School of Nursing

Please see Bartlett abstract on page 31.

Tara Hufford

Study of Supernovae in Search of Dark Energy

Physics/Theoretical Physics and Applied Mathematics (2010)

Mulcahy Scholar

Faculty Mentor: Dr. John Cunningham, S.J., Physics

Recent studies have concluded that 95% of the universe is not ordinary matter, with 73% attributed to dark energy. The acceptance of Type Ia supernovae (SNe) as a standard candle can be used to study

dark energy parameters. There is concern for “contamination” from non-Type Ia sources. To study non-Ia contamination, a parametric supernovae simulation program (SNANA) was used to simulate SNe lightcurves using prototypical templates of all SNe types, and then to assess the probability that each lightcurve was from a Type Ia SN (the fit probability). The Sloan Digital Sky Survey cosmological fitter, which serves as a default fitter, fits the cosmological parameter, w_0 , from these simulations. A value of $w_0 = -1$ was used when generating SNe lightcurves. From these studies, initial results showed a contamination rate of approximately 20%. However, by increasing the fit probability cut the contamination rate reduced to 7% with the loss of approximately 600 Type Ia SN. Further study continues to investigate possible cuts on various parameters such as the distance modulus to reduce contamination.

Alexandra Johnson

Childhood Obesity: A Serious Problem in Cook County (Presented in collaboration with Catherine Juan Bartlett, Sophia Anne Hoesch, and Pik Ki (Kimberly) Tang.)
Health Systems Management (2010)
Faculty Mentor: Dr. MaryMargaret Sharp-Pucci, School of Nursing
Please see Bartlett abstract on page 31.

Donald Jonker

Expression and Function of a Novel Gene from Soybean Retroelement, SIRE1
Biology and Psychology (2010)
Carbon Scholar
Faculty Mentor: Dr. Howard Laten, Biology

SIRE1, which stands for soybean interspersed repetitive element, is a DNA element found in soybean chromosomes that belong to a class of repetitive mobile DNAs called retrotransposons. Characterization of the SIRE1 DNA sequence revealed that SIRE1 possesses a gag region, pol region, and, unlike any of the many plant retrotransposons that have been characterized, SIRE1 possesses a hypothetical envelope region. SIRE1 is unusual among plant retroelements in that it contains a gene that may code for an envelope-like protein similar to those found in mammalian retroviruses. As such, SIRE1 and retroelements with envelope-like genes are called endogenous retroviruses. However, whether this hypothetical envelope-like protein in SIRE1 is actually made in soybean, and if so, whether it has the same or similar function as retroviral envelope proteins is presently unknown. This research describes experiments to answer these questions.

Akadia Kachaochana

Filling the Gaps in the HC21p Physical Map
Biology, Molecular Biology Emphasis (2011)
Biology Summer Research Fellowship
Faculty Mentor: Dr. Jeffery Doering, Biology

Our laboratory is working towards completing a map of the short arm of human chromosome 21 (HC21p), which is a heterochromatic genome region primarily composed of repetitive elements. These elements are difficult to sequence, and so were not studied by the Human Genome Project. We have a phage lambda HC21-specific genomic library created with HindIII-generated fragments. To see if our library indeed carries HC21p sequences, I made a probe of β_2 , a high copy number repeat, which we have previously mapped to HC21p. I screened our library with this probe, and I obtained successful positive plaques. My ultimate goal is to purify the DNA containing my β_2 marker in order to sequence the DNA. I can then fill in the gaps present in our map.

Gennadiy Katsevman

Does Eph/Ephrin Signaling Contribute to the Divergence of Sensory Nerves During Embryonic Development?

Biology and Philosophy (2010)

Carbon Scholar

Faculty Mentors: Dr. M. William Rochlin, Biology and Dr. Timothy O'Brien, Mathematics and Statistics

An interesting event that occurs throughout nerve development is the divergence of groups of axons into separate nerves that eventually contact different target regions. Recent evidence suggests that Eph receptors and their ephrin ligands have a prominent role in nerve divergence and axon guidance. I am investigating the role of Eph/ephrin signaling in the divergence of two rodent taste nerves—the combined posterior auricular/chorda tympani (PA/CT) and the greater superficial petrosal (GSP)—that originate from the geniculate ganglion and terminate in different areas of the head.

Immunohistochemical techniques were employed on embryonic mouse sections to localize various Eph receptors and ephrins during and slightly after the divergence event. My results show for the first time that Eph receptors and ephrins are differentially distributed both in the PA/CT and GSP as well as in their pathways. In situ hybridization and in vitro culture experiments are underway to complement immunostaining results.

Muhammad J Khan

Characterization of Telomeric and Subtelomeric Regions of Human Accrocentric Chromosomes

Physics and Biophysics (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Jeffery Doering, Biology

Telomeres are specialized structures at all chromosome ends that are thought to function as buffers against end-to-end chromosome fusion. Telomeric repeat sequences promote genomic stability in the normal cellular life, as chromosomes without telomeres undergo end-to-end associations and breakage-fusion-bridge cycles. Telomeres are of different length in different species from 300-600 base. Telomeres are shortened every time a cell divides and this shortening may have a role in senescence and in the prevention of cancer. The telomere structure of acrocentric chromosomes is still unknown. Preliminary work has resulted in the characterization of a subtelomeric region common to acrocentric p arms. A 147 bp tandemly repeated sequence is found in the telomere region of acrocentric chromosomes and my research shows this 147 bp sequence is part of the 9 kb subtelomeric repeat. PCR with the usage of telomeric and subtelomeric primers allow us to amplify a subtelomeric sequence immediately adjacent to the telomere. Preliminary examination has shown the difference between subtelomeric structure amongst accrocentric chromosomes.

Alyssa Kuschel

The Effects of Mutations on Myoglobin and Hemoglobin: Computational and Experimental Studies

Bioinformatics (2010)

Carbon Scholar

Faculty Mentor: Dr. Kenneth Olsen, Chemistry

Globins are small proteins that bind oxygen to an iron porphyrin ring, like mammalian myoglobin in muscle tissue. There have been debates on whether the binding and exiting of small ligands, like oxygen, move through a single pathway or multiple pathways. Our hypothesis is that mutational data can be better explained by multiple pathways, rather than by a single pathway. This will be concluded by using the LESMD method to determine the exit pathways for oxygen from normal Sperm Whale myoglobin and *Cerebratulus* hemoglobin and their respective mutations. These simulations will be

interpreted kinetically first from our simulations and then by experiments in the laboratory of Dr. John Olson at Rice University. By using computational and experimental approaches I will then analyze the oxygen entry and exit rates of both myoglobin and hemoglobin mutations.

Erin Martin

Medical Interpretation: Can it be effective? (Presented in collaboration with Melissa Fernandes.)
International Studies and Spanish (2010)
Faculty Mentor: Dr. Wiley Feinstein, Modern Languages and Literatures
Please see Fernandes abstract on page 34.

Sarah Massarani

Cycling of Nitrogen by Cave Bacteria
Biology, with Ecology emphasis (2012)
Mulcahy Scholar
Faculty Mentor: Dr. Domenic Castignetti, Biology

The nitrogen cycle plays a crucial role in the cycling of nitrogen throughout terrestrial ecosystems and making it available to organisms. The cycle involves taking nitrogen from the air and converting it into ammonia, nitrate, and nitrite, which organisms can use to make their proteins, amino acids, DNA and RNA. Our collaborative research, with Dr. Hazel Barton, includes looking at a number of Kentucky isolates and determining their ability to perform various aspects of the nitrogen cycle. These, and other cave isolates could be cycling nitrogen because there is pitting of the rock minerals by ammonia, which is a product of the nitrogen cycle.

Owen McKenna

Reconstructing the History of Emergent Wetland Plant Invasions Using Aerial Photo Interpretation
Biology (2011)
Mulcahy Scholar
Faculty Mentor: Dr. Nancy Tuchman, Biology and CUERP Director

Invasive aquatic plants alter the flora and biogeochemistry of Great Lakes coastal wetlands. Determining the historical spatial progression of plant invasions will benefit our understanding of invasion ecology by analyzing floristic, edaphic, and biogeochemical variables along a time-since-invasion gradient. We developed Aerial Photo Interpretation (API) methods for identifying monocultures of emergent wetland plants from aerial images, in a Geographic Information System. Using these methods, we created an historical record of *Typha x glauca* spread in four Great Lakes coastal wetlands over a 70-year period. Accuracy of our API was verified by collecting spatially located reference data using Global Positioning Systems in the field at all four wetlands. Using pollen core analysis, lead-210, and cesium-137 dating in a Lake Huron wetland, we confirmed our API results: *T. x glauca* has been present and spreading since 1952 (± 5 years) and reached dominance in the marsh by the early 1970s.

Lauren Mogil

Analysis of Minisatellites in the Repeat Region of the Ogre Retroelement in Soybean
Biology and Bioinformatics (2011)
Carbon Scholar
Faculty Mentors: Dr. Howard Laten, Biology and Dr. Catherine Putonti, Biology and Computer Science

The ogre retroelement has a minisatellite region upstream of its 3' LTR and there are four distinct tan-

dem repeats found in its consensus sequence. The significance of this minisatellite region is not yet known, however it has been found to be associated with other parts of the soybean genome. A computational program has been developed to search for the minisatellite region, independent of the ogre retroelement, and look at what it is associated with upstream. Non radioactive Southern blots performed showed the presence of the minisatellites in the soybean genome using the different repeats as probes. It is possible that this minisatellite region has more significance that originally thought.

Anne Mohan

Ligand-binding Properties of the Truncated-Hemoglobin in Mutants of Mt-trHbO (Y(CD1)F/W(G8)F)
Biochemistry and Neuroscience (2011)

Mulcahy Scholar

Faculty Mentor: Dr. Kenneth Olsen, Chemistry

I am interested in studying the effects of the key residues Y(CD1) and Y(B10) on the O₂ escape pathways in the truncated hemoglobin of Mycobacterium tuberculosis when they have been double mutated to a phenylalanine Y(CD1)F/W(G8)F. I hope to be able to present an atomic level explanation of how residue mutations affect the ligand escape. One of the most distinctive features characterizing trHbs is the presence of a specific and conserved array of polar residues in the heme distal site cavity. In Mt-trHbO the heme bound cyanide is stabilized by a strong Hydrogen bond connecting the ligand Y(CD1) to W(G8) with an additional weak Hydrogen bond connecting Y(CD1) to W(G8), with W(G8) being the invariant residue in group II and III trHbs. Since the role of W(G8) in ligand binding has not been determined yet, I propose a study of O₂ escape pathways from the distal heme site in the mentioned mutated residues.

Erin Moore

Neuroendocrine-Immune Basis for the Cancer Symptom Cluster of Poor Sleep, Fatigue and Depression
Nursing (2010)

Provost Fellowship

Faculty Mentor: Dr. Linda Janusek, Nursing

The symptom cluster of poor sleep, fatigue, and depression, often occurs in women stressed by a breast cancer diagnosis. IL-6, an immune mediator released in response to psychological stress, disrupts sleep patterns and may contribute to poor sleep, fatigue, and depression. Psychological stress activates neuroendocrine systems and disrupts the diurnal cortisol rhythm (DCR). The DCR is entrained with sleep and mood and is affected by IL-6. The purpose of this study is to evaluate IL-6 and the DCR as a shared neuroendocrine-immune mechanism underlying this cancer symptom cluster. Women newly diagnosed with breast cancer will complete sleep diaries and wear a wrist activity monitor for 6 days, which detects motion as an index of sleep. On days 5 and 6 of monitoring, women will collect saliva samples to determine their CDR. On day 7 women will complete self-report measures of sleep quality, fatigue, depression and have their blood drawn for IL-6. Regression models will evaluate relationships among study variables. The results will advance understanding of mechanisms underlying this symptom cluster and spur evidence-based interventions to reduce burden due to this symptom cluster.

Hannah Murphy

Degenerative Joint Disease in Medieval Women
Anthropology (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Anne L Grauer, Anthropology

The presence of degenerative joint disease (DJD) was examined to investigate the lives of medieval women from a cemetery population at St. Helen-on-the-Walls from York (approximately 1100-1550 AD). This population represented some of the poorest residents of the city. Data from seven joints in the human body was examined and statistically tested. Results indicated that there was no statistical significance in DJD between the sexes in six of the seven joints, regardless of age at death of the individual. Data from the shoulder joint, however, indicated that joint use and/or damage to the shoulder differed significantly between men and women. This data is compared to other medieval populations in Britain in an effort to understand the possible etiology of the difference.

Daniel Neubauer

Empowering the Past: Using Science for a Social Cause

Anthropology and Biology (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Anne L Grauer, Anthropology

Museums are important resources, as they help provide insight into our past and future. The preservation and use of museum collections, however, depend upon available funds, technologies, and our own priorities. Over the past 50 years the Field Museum of Natural History (FMNH) has placed considerable emphasis on the care and curation of human skeletal remains. In accordance with the recent law passed by Congress, known as the Native American Grave Protection and Repatriation Act (NAGPRA), the FMNH has undertaken an extensive inventory and analysis of the human remains under their care. In the course of this analysis, cardboard boxes containing human teeth were discovered. Two, labeled "Hopewell Site" and "Cahokia" are the focus of this project. This project had two goals: 1) To restore the dignity and power of the individual Native Americans whose remains are in the care of the FMNH. And 2) To enhance the ability of researchers to learn from human skeletal remains. In order to meet these goals, three objectives were created: 1) To develop a protocol to identify all teeth contained within the boxes. 2) To re-associate all teeth with the individual to which they belong. And 3) To determine the minimal number of individuals impacted by the cleaning and reorganization of human remains carried out in 1986.

Kevin Nuechterlein

The Relationship of Depressive Symptoms to Self-Reported Executive Functions and College Adjustment

Psychology (2010)

Provost Fellowship

Faculty Mentor: Dr. S. Duke Han, Psychology

This study examined the relationship between self-reported executive functions (EFs), depression, and college adjustment. Previous research has indicated that EFs are related to adjustment problems in college. The current study proposes a model in which depression mediates the relationship between self-reported EFs and college adjustment. Sixty-nine undergraduates (82% female), ages 18-24 (mean age 19, standard deviation 1.3 years) completed the Behavior Rating Inventory of Executive Function-Adult Version (BRIEF-A), Beck Depression Inventory-II (BDI-II), and College Adjustment Scale (CAS). Three mediational models were tested. Depression mediated the relationship between metacognition and academic problems, behavioral regulation and interpersonal problems and behavioral regulation and substance abuse problems. The current study provides evidence for a relationship between self-reported EFs and college adjustment outcomes that can be explained by depressive symptomology.

Michal Olszewski

Effects of Invasive Plant Typha X Glauca on Wetland Denitrification and Emission of Nitrous Oxide

Biology and French (2010)

Carbon Scholar

Mentors: Dr. Nancy Tuchman, Biology and CUERP; Dr. Alanah Fitch, Chemistry; Dr. Pamela Geddes, Northeastern Illinois University; Dr. Daniel Larkin, Chicago Botanic Garden; and Shane Lishawa, CUERP Research Associate

Denitrification (DN), a critical wetland ecosystem function requires specific soil conditions: anoxia, and the availability of nitrate (NO₃⁻) and organic carbon. The invasive plant *Typha x glauca* has been associated with increased soil NO₃, organic matter and also with greater soil aeration, which may result in increased flux of N₂O, a potent green house gas. To test these interactions, two experiments were conducted: 1) DN activity of soil cores collected from Lake Michigan coastal wetlands was analyzed using acetylene inhibition and helium assays; and 2) ¹⁵NNO₃⁻ was traced through the DN process in controlled microcosms with wetland soils at a range of redox levels. Results from the acetylene inhibition assay were inconclusive as to whether *Typha* affected DN quality. Helium assay samples are currently being analyzed. Results from the ¹⁵N study revealed a strong positive relationship between soil aeration and relative N₂O emissions. This suggests, *Typha* mediated increases in soil aeration, may result in increased N₂O emissions.

Richard Pardilla

Synthesis of Phenothiazine-based Photosensitizer Complexes in Photodynamic Therapy

Biochemistry (2010)

Provost Fellowship

Faculty Mentor: Dr. David Crumrine, Chemistry

Photodynamic therapy is a cancer treatment that utilizes a photosensitizer, light, and oxygen. It is a local treatment where light is irradiated where the tumor is located, particularly for epithelial carcinomas. In order to enhance tumor selectivity, a photosensitizer should have a ligand that will target tumor cells. Folic acid has been proposed as an effective recognition probe. Therefore, the goal of this research is to synthesize and examine the effectiveness of phenothiazine-based photosensitizer-folic acid complexes in photodynamic therapy.

Emily Peterson

Development of a Bacterial Community Microarray

Forensic Science (2011)

Carbon Scholar

Faculty Mentor: Dr. John J. Kelly, Biology

The goal of this project is to develop a Bacterial Community Microarray (BCM) as a tool to simultaneously assess both bacterial community composition and function. The BCM has the potential to be a powerful technology that will offer new insights into Microbial Ecology, Medical Microbiology and Industrial Microbiology. The project begins by addressing two critical research questions: 1) Can different types of bacteria be immobilized on a microarray with similar efficiencies, and 2) Can a microarray be used to immobilize a representative sample from a mixed community of bacteria. These questions are addressed by growing a diverse set of bacterial species in the lab, immobilizing each of these various species individually on bacterial cell microarrays, and assessing the immobilization efficiency for each species. Then artificially constructed microbial communities are immobilized and using DNA-based tools we compare the composition of the original communities to the immobilized populations of cells.

Kathleen Proudfoot

ADP Glucose Pyrophosphorylase Mutant Enzymes in E. coli

Biology (2010)

Mulcahy Scholar, Provost Fellowship, and Research Mentoring Program

Faculty Mentor: Dr. Miguel Ballicora, Chemistry

I have been doing research on the same enzyme in *E. coli* throughout all my time in the lab. The summer was spent creating a particular mutant, which utilized simple techniques but took a long time due to unavoidable complications. We also spent the summer helping a grad student with a project on a different mutant enzyme from different organisms, which used the same techniques (transforming cells, purifying protein, etc.) we would be using once our DNA was mutated as we intended it to be, without any side mutations. At the beginning of the fall, we finally achieved this, and after basically cutting and pasting our fragment of mutant DNA (representing the mutant enzyme) into a small bacterial plasmid, we transformed the plasmid into *E. coli* cells with no native enzyme activity (and also transformed cells with plasmids containing no enzyme DNA, some with a wild type enzyme DNA, and some with a previously created mutant, all so we could compare activity). We then grew the cells so that they would express large amounts of the enzyme, and then harvested that enzyme, first by centrifugation, then by affinity chromatography. Once the enzyme was pure we tested activity qualitatively, using iodine staining, and quantitatively, using an HPLC.

Vinicio Reynoso

Profiling Members of Microbial Communities Using New Computational Methods

Bioinformatics, Molecular Biology, and Spanish (2010)

Center for Urban Environmental Research and Policy (CUERP) Fellow

Faculty Mentor: Dr. Catherine Putonti, Biology and Computer Science

The microbial life present within environmental niches includes viral, bacterial, fungal species, the majority of which cannot be cultured in the laboratory. Advances in next-generation sequencing provide us with a unique opportunity to study these microbial communities. This new technology makes it possible to assess both the species as well as the functional elements present. Making such identifications, however, is computationally challenging due to the fact that the sequence (read) lengths generated by this technology are typically very short. BLAST-ing the reads results in many spurious hits and/or matches to many different species. To resolve such issues, we have developed a new software suite. We have utilized this tool for the analysis of environmental samples collected and sequenced by our collaborators. Herein, we present the preliminary results of our study.

Juan C. Sanchez

Effects of Chronic Stress on Memory

Biology (2010)

Mulcahy Scholar and Biology Summer Research Fellowship

Faculty Mentor: Dr. Louis R. Lucas, Biology

Stress has been shown to physiologically affect regions of the brain associated with memory formation. In particular, animals subjected to chronic restraint stress have demonstrated increased dendritic atrophy in the hippocampal region of the brain. Using an eight-arm radial arm maze, we tested the effects of chronic stress on the memory of male rats. Visual cues were used to compare the spatial memory function of the animals. Possibly due to physiological damage of the hippocampus, chronically stressed rats had marked spatial memory impairments when compared to control groups, which were not exposed to restraint stress. These data are consistent with the expectation that memory performance would decrease after experiencing a prolonged stressful event. To correlate the behavioral effects of chronic re-

straint stress with physiological changes, a marker of neuronal activity, Zif 268, was used to examine sections of brain tissue. Stress results in decreased neurochemical activity in areas of the brain associated with memory.

Matt Schroer

Chironomidae Community Structure in Coastal Ponds of the Copper River Delta, Alaska

Biology with Ecology Emphasis (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Martin Berg, Biology

The Chironomidae (Diptera), known as the non-biting midges, is often the most abundant insect taxon in freshwater ecosystems. In many of these systems the larvae of this family of flies represent an important source of secondary production available to organisms at higher trophic levels. The purpose of this project is to examine the Chironomidae community structure in coastal ponds on the Copper River Delta, Alaska. To accomplish this chironomid larvae collected monthly during the summer of 2008 from two different pond ecosystems will be sorted and identified to the genus level. Any differences in community structure between the two pond ecosystems will be examined and discussed.

Breanna Scorza

Novel Photodynamic Therapy via Folate-Mediated Endocytosis

Chemistry and Biology (2011)

Mulcahy Scholar

Faculty Mentor: Dr. Kenneth Olson, Chemistry

Photodynamic therapy is a new and developing field of tumor treatment with unlimited opportunities for growth. A PDT agent is made up of a photosensitive molecule and a carrier molecule. When irradiated with light of a certain wavelength the photosensitizer reacts with oxygen to cause localized oxidative damage to tumor cells. This project aims at the organic syntheses of new and more efficient targeted PDT agents. Our drug will utilize hemoglobin as an oxygen reservoir and Folate as a tumor targeting molecule. We will form a PDT complex with these agents and two different photosensitizers, Eosin and Malachite Green dye, to compare the tumor killing rate of each. These products will then be characterized by UV-VIS spectrophotometry, reactive oxygen species production, mass spectrometry, and various physical properties. Testing in vitro will be carried out in cell culture and possible in vivo in clinical trials if our compound shows successful results in fighting tumors.

Michael Scott

Ligand-binding Pathways of the PAS domain in EcDOS protein

Biochemistry, Spanish, and Biology (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Kenneth Olson, Chemistry

All living organisms must be able to respond to changes in their environment involving gases, particularly changes in O₂, CO, and NO. Researchers have attributed these processes to a broad group of protein sensors, most notably the heme-PAS family of proteins. The protein called EcDOS for Direct Oxygen Sensor of the bacteria *Escherichia coli* belongs to this family. Our computational techniques center on molecular dynamics simulations, specifically Locally Enhanced Sampling Molecular Dynamics (LESMD) using the program NAMD. With these techniques, I have mapped out ligand-binding pathways for the native protein and several mutants that we have created. These pathways are represented by three-dimensional structures using VMD. I have also used analysis techniques to elucidate more about the sensing domain and how it interacts with its ligand, including ligand-residue contact analysis.

Mary Severin

Ligand-Escape Pathways of the Oxygen Sensing Protein FixL

Bioinformatics (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Kenneth Olson, Chemistry

FixL is an oxygen-sensing heme domain containing protein found in bacteria, unicellular eukaryotes and higher plants. FixL is approximately 130 residues and very unique due to its low infinity for CO and O₂. Understanding the ligand escape pathways of FixL from *Rhizobium meliloti* will provide a better understanding of its biological function. This project examines ligand escape pathways from the distal residues using a method called Locally Enhanced Sampling Molecular Dynamics (LESMD) (Golden et al., 2008). LESMD, as implemented in the molecular dynamics program NAMD (Phillips et al., 2005), is used to calculate the ligand binding pathways for RmFixL. Current LESMD runs have shown that FixL favors two ligand binding pathways. This study is being furthered by repeating these studies on the I209A mutant to see if we can explain the loss of oxygen-sensing that this mutation causes. Studies done with the mutant FixL will also determine the structure-function relationships for FixL.

Maheen Siddiqi

Investigations into the Expression of Mitochondrial Genes in the Mosquito Stages of Malaria Parasite Plasmodium

Biology (2010)

Mulcahy Scholar and Provost Fellowship

Faculty Mentor: Dr. Stefan Kanzok, Biology

The lifecycle of the *Plasmodium* parasite, the causative agent of Malaria, is complex as it alternates between the vertebrate host and the mosquito vector. The environments of both the host and vector are drastically different, requiring *Plasmodium* to adapt gene and protein expression accordingly. While the mitochondrion of *Plasmodium* is small and underdeveloped in the human host it increases in size and complexity once the parasite enters the mosquito vector. Here we report on the regulation of genes comprising the ATP synthase complex of the Malaria parasite. We hereby focused on the early developmental stages of *Plasmodium* in the mosquito vector as well as in cultured mosquito stages. Our data show that these genes exhibit significant up-regulation at 12 hrs in mosquito as well as in culture samples, indicating an increased activity of the parasite's mitochondria. Interestingly, our observations of increased gene expression coincides with a motile stages of the parasite, the ookinete, which has the task to actively escape the blood meal in the mosquito midgut to establish vector infection.

Patrick Sinclair

The Influence of Occupation, Education, and Income on Cardiovascular Disease and Morbidity

Biology and Economics (2010)

Provost Fellowship

Faculty Mentor: Dr. Timothy Classen, Economics

Using NHANES data and through statistical and econometric analysis this study seeks to understand the relationships between occupation and cardiovascular disease. This study also provides for a natural inquiry into the effects of education and income on health. We hope to find correlations that can be used to help provide further understanding on the factors that affect health and, in particular, lead to cardiovascular compromise. We find that occupational stressors, lifestyle, and environment that associated with each of these socioeconomic variables are influential in dictating individuals' health. The results show that increases in income and education increase health and that higher income and education occupations also have a positive affect on health. The strongest correlations can be found with education.

Manpreet (Sonia) Singh

Noninvasive Drug Testing in Small Populations

Chemistry (2010)

Center for Urban Environmental Research and Policy (CUERP) Fellow

Faculty Mentor: Dr. Paul Chiarelli, Chemistry

The consumption of illicit drugs has always been a concern for public health and law enforcement agencies. They generally obtain statistics of drug usage from medical records, crime reports, and personal surveys, but this is unreliable since most people do not want to report/admit that they are engaging in illegal activities. These statistics are very important to the public health agencies because they are used to determine the policies that will be put in place. Thus, the goal of this study is to develop a means of testing wastewater and natural water for the presence of different drugs of abuse so that informative, non-invasive means of testing targeted populations may be carried out. I have been utilizing analytical methods based on solid phase extraction, liquid chromatography (LC) combined with mass spectrometry to test the wastewater to determine the exact concentration of nine different drugs being consumed in a small, demographically well-defined population. These measurements have been conducted for large populations defined by municipal wastewater treatment plants in Milan Italy and Chicago, IL. These measurements have been carried out on a school population of approximately 700 students. The most abundant drug metabolites found in the wastewater taken from the local school were derived from marijuana, morphine, amphetamine, and cocaine. Measureable quantities of cocaine metabolites were found in the tap water blank samples taken from this facility. We will discuss the analytical methods used to make these measurements as well as strategies for carrying drug testing.

Malachy Sullivan

Impacts of Stream Characteristics on Denitrifying Biofilms

Biology with Molecular Emphasis (2010)

Center for Urban Environmental Research and Policy (CUERP) Fellow and Provost Fellowship

Faculty Mentor: Dr. John Kelly, Biology

Human-induced increases in the availability of fixed nitrogen to terrestrial and aquatic ecosystems have generated significant modifications to ecosystem function. In comparison with the pre-industrial age, nitrogen loading into the world's oceans has increased as much as 20-fold, resulting in decreases in water quality and the development of hypoxic zones. While streams and rivers transport much of this nitrogen into the oceans, there exist a number of processes within these systems that can either retain nitrogen or transform it. One such process is denitrification, the microbially mediated transformation of biologically available NO₃⁻ into biologically unavailable N₂ gas. In order to investigate the effects that physical and chemical stream characteristics have on microbial consortia involved in denitrification, we placed ceramic tiles in two streams with differing physical and chemical characteristics. The tiles served as substrates for the formation of periphytic biofilms, and they were collected 1, 2, 3, and 4 weeks post-placement. Over the course of the study the streams differed significantly in depth, discharge, and the concentration of inorganic nutrients. Tiles from both streams showed the development of denitrifying biofilms, but molecular analysis of bacteria within the biofilms showed significant, site specific differences in the composition of the denitrifying communities.

Pik Ki (Kimberly) Tang

Childhood Obesity: A Serious Problem in Cook County (Presented in collaboration with Catherine Juan Bartlett, Sophia Anne Hoesch, and Alexandra Johnson)

Health Systems Management (2010)

Faculty Mentor: Dr. MaryMargaret Sharp-Pucci, School of Nursing

Please see Bartlett abstract on page 31.

James J. Tasch

Protein expression studies of Thioredoxin-1 and Thioredoxin(469) throughout the life cycle of the rodent model malaria parasite Plasmodium berghei

Molecular Biology (2010)

Mulcahy Scholar and Provost Fellowship

Faculty Mentor: Dr. Stefan Kanzok, Biology

The malaria parasite Plasmodium, the cause of 1-2 million deaths each year, is transmitted between humans by female Anopheles mosquitoes. Within the insect, there are many challenges the parasite is able to withstand to facilitate survival and transmission to the next human host. Cytotoxic reactive oxygen (ROS) and reactive nitrogen species (RNS) that are produced by the mosquito as an immune response against the invading parasite are among the threats the parasite encounters. We hypothesize that a defense against ROS and RNS is crucial for the survival of the parasite within the mosquito and, by extension, for malaria transmission. Here we present our investigation into the protein expression of two putative antioxidant genes on the rodent malaria model organism Plasmodium berghei. Using immunofluorescence and confocal microscopy we show the expression pattern and the subcellular localization of these candidate genes throughout the complex life cycle of this parasite.

Son Ton

Eph/Ephrin Signaling in Gustatory Epithelium During Axon Targeting and Maturation

Biochemistry and Biology (2010)

Biology Summer Research Fellowship, Mulcahy Scholar, and Provost Fellowship

Faculty Mentor: Dr. William Rochlin, Biology

Eph/ephrin signaling influences synapse targeting throughout the CNS, but less is known about their roles during peripheral sensory axon targeting. We are profiling the expression of Eph and ephrin proteins in developing and mature taste papillae and also testing the influence of these molecules on gustatory and somatosensory neurites in vitro. In late embryonic rat embryos (E18), when taste and somatosensory axons have begun to invade fungiform papilla epithelium, anti-EphB1-3 (which detects EphB1, B2, and B3) labels geniculate and trigeminal axons. However, ephrin-B1 colocalizes with afferent staining in late embryonic (E15.5) mice, so it will be important to determine if ephrin-B1 and ephrin-B2 have different effects on the EphB expressing axons. Both EphA5 and EphA7 also strongly label a set of cells subjacent to the epithelium, perhaps basal stem cells. In postnatal rats and mice less than P5, the patterns of EphB1-3 and ephrin-B2 are the same as at late embryonic stages. Anti-ephrin-B1, however, no longer labels afferents but does label the epithelium. To determine if Eph/ephrin signaling stabilizes or repels sensory neurites, we are conducting stripe assays. Initial experiments indicate that stripes of pre-clustered ephrin-B1-Fc repel E15 and E17 rat geniculate and trigeminal neurites, but not postnatal neurites despite their continued expression of EphBs. Likewise, ephrin-A4-Fc stripes did not repel postnatal trigeminal neurites that express EphA7. Further studies are underway to determine if different concentrations of ephrin-Fc's or Eph-Fc's stabilize or repel geniculate or trigeminal neurites during initial targeting, postnatal, and adult stages.

Steven Tran

Investigating the Ligand-Binding and Catalytic Properties of E. coli ADP-Glucose Pyrophosphorylase

Bioinformatics (2010)

Mulcahy Scholar and Provost Fellowship

Faculty Mentor: Dr. Kenneth Olson, Chemistry

The regulatory protein ADP-Glucose Pyrophosphorylase in Escherichia coli catalyzes the first committed step in the biosynthetic pathways of glycogen synthesis and starch synthesis in bacteria and plants,

respectively. We hope to determine the mechanism of catalysis and which residues are vital for the reaction to take place. Through mutating certain key residues in the protein, we will be able to determine which residues contribute to the ligand-binding properties of the protein with its substrates. The computational research of our project will be joined with another experimental group in Argentina in an effort to confirm the laboratory research of this protein. Through the examination of this protein's catalytic properties, the collected data is expected to allow for the manipulation of its catalytic properties in plants and lead to better yields or "more efficient" plants.

Vinaya Vasudevan

Escape Pathway of a Large Ligand from the Heme Pocket of Myoglobin

Mathematics and Bioethics (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Kenneth Olson, Chemistry

This study is based upon the findings of Dr. John Olson at Rice University. This project will demonstrate the escape pathway of ethylene isocyanate (ETN) from the distal heme pocket of sperm whale myoglobin. The computational molecular dynamics used to elucidate this pathway is known as Targeted Molecular Dynamics (TMD), which uses steering forces to guide a molecule from an initial to a target structure using energy minimization statistical calculations. The goal is to demonstrate that the escape route of the ETN is facilitated by the outward swinging of the His 94 residue in the heme pocket, which would normally block the ETN's escape from the myoglobin.

Ted Vellos

Development of a Polymeric Hemoglobin-Based Blood Substitute

Biochemistry (2010)

Mulcahy Scholar

Faculty Mentor: Dr. Kenneth Olson, Chemistry

Blood substitutes have been sought after for years, however, many problems have arose with their development. Hemoglobin outside of living red blood cells exhibit undesirable properties for an oxygen carrier, such as vasoconstriction and autooxidation. Our proposed research will elude the problem of vasoconstriction by developing high molecular weight hemoglobin polymers through cross-linking. This will prevent them from entering small areas and retrieving nitric oxide, and should stop vasoconstriction. Our proposed research also hopes to return oxidation chemistry back to normal levels by modifying our hemoglobin. Two enzymes, catalase(Cat) and superoxide dismutase(SOD) will be linked to the hemoglobin complex. These will, in effect, lower autooxidation to more suitable levels. These polymers will then be characterized and tested for molecular weight and autooxidation and required data will be taken. Our polymers will be introduced into cultured cells to observe any adverse effects.

Tyler J. White

Effects of an Experimental Flood on the Diets of Invertebrates in the Grand Canyon

Molecular Biology and Environmental Science (2011)

Provost Fellowship

Faculty Mentor: Dr. Chris Peterson, Biology and Natural Sciences

This project investigates the effects of the March, 2008 Beach Habitat Building Flow (BHBF, experimental flood) on invertebrate resource consumption and the taxonomic composition of diatoms in their diets. It contributes to a better understanding of how dam operations affect invertebrate and ultimately fish populations to promote proper river maintenance in the future. When comparing samples

before and after the flood, I observe no significant alterations in the gut content composition. There is also no apparent significant difference in the diatom species composition present in the epilithon. My results indicate that the experimental flood did not have a detrimental impact on the availability of food resources for aquatic invertebrates. This implies further research is necessary to elucidate the importance of seasonal floods for the Colorado River system, and that more frequent BHBFs may be necessary to help restore the ecosystem to pre-dam conditions.

April Williams

A Comparison of the Compositional Proclivities of the Complete Genomes of Plasmodium falciparum and Human

Bioinformatics, Biology, Biostatistics (2010)

Carbon Scholar

Faculty Mentor: Dr. Catherine Putonti, Biology and Computer Science

Pathogens and hosts have a dynamic relationship, one that is ever changing at the molecular level - the pathogen influencing the evolutionary path of the host and the host influencing the evolutionary path of the pathogen. The pathogen's adaptation to a particular host could serve several purposes, e.g. to mimic the host to avoid detection, to take advantage of the host's cellular machinery, to increase virulence, etc. Novel algorithms and data structures have been developed in our laboratory that make it possible to quantify the "distance" (number of mutations) separating pathogen and host sequences. Through the examination of these distances, we hypothesize that it is possible to monitor pathogen adaptations at the sequence level and further our understanding of the function of the pathogen machinery. Our results present the understanding we gained through our exhaustive calculations for each of the annotated coding regions in *P. falciparum* and the human genome.

April Williams

A Study of the Culturable Microbial Diversity of Several Chicago Beaches

Bioinformatics, Biology, Biostatistics (2010)

Women in Science Enabling Research (WISER)

Faculty Mentor: Dr. Catherine Putonti, Biology and Computer Science

The microbial composition, especially pathogenic organisms, of aquatic environments in which humans spend recreation time as well as draw natural resources from has always been of great concern. Beaches are routinely tested for the presence of *E. coli*, but little is known about what other microbes are present in beach water. Water samples were taken from three different Chicago beaches at three different time points, the beginning, middle and end of open season. The microbial diversity of culturable bacteria was explored by plating water samples on several differential media. Morphologically unique colonies were chosen and their 16s rRNA genes were amplified. The sequence data obtained was blasted against the NCBI bacterial reference set, identifying the culturable bacteria present. The results from this study show how the microbial diversity varies from beach to beach and also within the same beach during different time points and weather conditions.

Laurel Yohe

The Behavioral and Neurochemical Analysis of the Effects of Stress on Aggressive Behavior

Bioinformatics, Biology with Ecology Emphasis, and Neuroscience (2011)

Carbon Scholar

Faculty Mentor: Dr. Louis Lucas, Biology

The purpose of this study is to determine whether or not stress and aggression are independent

phenomena. During this experiment, it is expected that aggression may have stress effects and/or stress may have aggressive effects. The hypothesis of the experiment is that if one increases the amount of stress on an animal, then the amount of aggressive behavior should increase as well. In order to investigate this idea, male laboratory rats will be exposed to varying lengths of exposure time to restraint stressors with varying amounts of recovery time. Measurements of aggression after exposure sessions will be taken using previously established methods used to quantify aggressive behavior in rats. Analysis of the neurochemistry will also be examined. The hormonal levels associated with neurochemical markers, such as glucocorticoids and testosterone, as well as the levels of the neurotransmitter receptors of dopamine and serotonin in the prefrontal cortex and nucleus accumbens will be evaluated with radioimmunoassay and nucleic acid hybridization. The more aggressive rats have higher levels of glucocorticoids and testosterone. Also, the rats exposed to the longer stressor periods have more of an increase in dopamine receptors and more of a decrease in serotonin receptors. The changes in the brain due to stress are similar to the changes in the brain due to aggression. These findings will help to determine if there is a correlation between aggression and stress effects on the brain and will promote further research of stress effects on aggressive behavior.

Angelika Zalewski

Expression analysis of oxidative defense genes in the mosquito stages of the malaria parasite

Plasmodium

Biology (2010)

Mulcahy Scholar and Provost Fellowship

Faculty Mentor: Dr. Stefan Kanzok, Biology

Malaria, a disease caused by a parasite of the genus Plasmodium, is transmitted between humans by way of Anopheles mosquitoes. To accomplish development within the mosquito and continue transmission, the parasite undergoes several transformations. The ookinete travels to and traverses the midgut epithelium, which serves as the prerequisite of infection using the insect vector. However, cytotoxic reactive oxygen and reactive nitrogen species primarily from the midgut present stresses with which Plasmodium must cope. We hypothesize that the parasite's defense mechanisms play pivotal roles in parasite survival and passage through the mosquito. We show that the malaria parasite significantly modulates gene expression during development in the mosquito (in vivo). We also see differential gene expression in cultured mosquito stage parasites (in vitro). In a different approach, gene expression profiles change in peroxiredoxin knockout parasites; they show compensatory expression of genes with related functions. Implications for parasite survival will be discussed.

Conrad Ziembinski

Denitrification and Ammonification of Microbial Cave Bacteria

Biology (2010)

Mulcahy Scholar and Provost Fellowship

Faculty Mentor: Dr. Domenic Castignetti, Biology

Nitrogen cycling is crucial to life as it is the way in which this vital element is passed from one organism to another. Nitrogen passes from plants to herbivores to carnivores. When either the plants or animals die, the N compounds they contain are broken down into ammonia (NH₃) which is then converted to nitrate (NO₃⁻) by bacteria. This process is called nitrification. Nitrate is converted to N₂ by the process of denitrification and released into the atmosphere as N₂ (1). N₂ becomes "fixed" by bacteria back into ammonia and then incorporated into the amino acids and nucleic acids needed by all organisms for growth and reproduction. As the entire process is a cycle, each component is crucial if N is to continuously cycle in the biosphere. Ammonification is the conversion of oxidized forms of nitrogen (for example, forms such as nitrate and nitrite) to ammonium (NH₄⁺). Data from past research indicates that

nitrogen cycling can be performed by the bacteria present in an oligotrophic (limited in the available nutrients) Kentucky cave. Dr. Hazel Barton, University of Northern Kentucky, is providing us with a set of 50 new isolates from an oligotrophic cave in Venezuela (2). We are studying whether microbes from the cave can denitrify and, if so, whether their denitrification is similar to that of common terrestrial bacteria. The isolates will also be tested for the ability to ammonify. As caves represent environments that have been isolated from the rest of the biosphere for long periods of time, cave microbes may have unique characteristics as they are adapted to these unique environments. Understanding if these isolates denitrify and ammonify helps to define how nitrogen is metabolized and used in these environments.